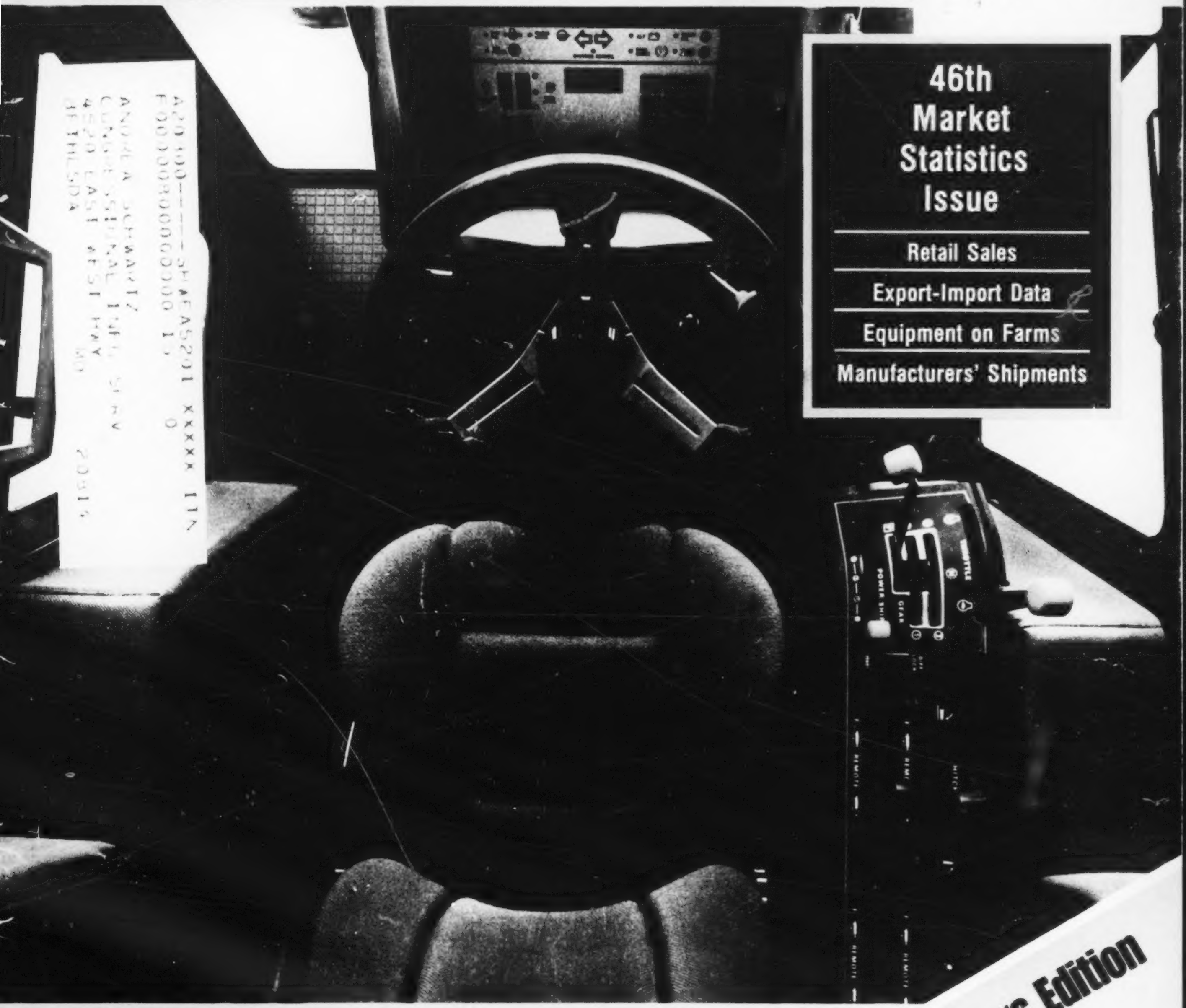
The business magazine of the farm & industrial equipment industry

November 1983

FOUR DOLLARS

Implement & Tractor



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46th Market Statistics Issue

- Retail Sales
- Export-Import Data
- Equipment on Farms
- Manufacturers' Shipments

Manufacturers Edition

Suppliers to the Industry

IMPLEMENT & TRACTOR
Editorial, advertising
and circulation correspondence
should be addressed to:
9221 Quivira Rd.
P.O. Box 12901
Overland Park, Kan. 66212
(a suburb of Kansas City, Mo.)
Telephone (913) 888-4664
Telex: 42-4156; Answerback
Intertec OLPK

EDITORIAL
Bill Fogarty, Editor
Irma Allread, Associate Editor
Scott R. Nesbitt, Associate Editor
Kevin Callahan, Art Director
Anita Blattner, Graphic Designer
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Agricultural Engineering
Glenn S. Hensley, Dealer Topics

CIRCULATION
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Susan Birnbaum,
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(Regional advertising sales offices
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ADMINISTRATION
R. J. Hancock, President
John Wickersham, Publisher

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Implement & Tractor

The business magazine of the farm & industrial equipment industry

November 1983 • Vol. 98 • No. 13

46th Annual Statistics Issue

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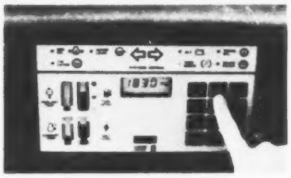

On the cover... As the horsepower boom in the tractor market has leveled off, manufacturers have turned to more emphasis on high-tech features. This instrumentation, on a new J I Case 94 series tractor, connects with an on-board computer.

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I&T Update

September: Big, Small Tractor Sales Rose

Retail unit volume improved in September on tractors under 40 horsepower, on two-wheelers over 140 hp and on over-200-hp four-wheelers. Other brackets and other products presented glum news, according to the flash report of the Farm & Industrial Equipment Institute.

Things are better than we thought! The FIEI has issued a corrected August flash report showing that over-140-hp tractors had a 28 per cent sales improvement rather than the 6 per cent decline reported earlier.

Unit Retail Sales

	September			January-September		
	1983	1982	Pct. Change	1983	1982	Pct. Change
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	3,362	2,840	+ 18.4	37,067	34,618	+ 7.1
40-99 hp	2,936	3,744	(21.6)	29,311	31,978	(8.3)
100-139 hp	866	1,339	(35.3)	10,684	14,496	(26.3)
140 hp and over	1,066	780	+ 36.7	8,929	7,854	+ 13.7
Total 2-wheel drive	**8,230**	**8,703**	**(5.4)**	**85,991**	**88,946**	**(3.3)**
4-wheel drive						
under 200 hp	168	218	(22.9)	1,364	2,343	(41.8)
200 hp and over	339	298	+ 13.8	2,026	2,729	(25.8)
Total 4-wheel drive	**507**	**516**	**(1.7)**	**3,390**	**5,072**	**(33.2)**
Total All Tractors	**8,737**	**9,219**	**(5.2)**	**89,381**	**94,018**	**(4.9)**
S-P Combines	1,486	1,820	(18.4)	8,177	9,209	(11.2)
Balers (200-lb. bales)	534	712	(25.0)	8,309	7,875	+ 5.5
Forage Harvesters (shear-bar type)	701	886	(20.9)	3,094	3,718	(16.8)
Mower-Conditioners	713	1,031	(30.8)	12,953	12,308	+ 5.2

Deere to Sell ADS Software To Its Dealers

Deere & Co. and Applied Data Systems, Inc., Scottsdale, Ariz., have reached a deal by which Deere will market a turnkey computer system to its dealers using ADS software.

Hans Ager, president of ADS, said the agreement is worth $10 million over five years. ADS will be involved at the outset of the project, he said, to provide installation, training and support to Deere.

The software will be marketed through Deere's Dealer Services Dept. The applications will be made available on Texas Instruments Business Systems and IBM System/36 computers. Installations, beginning this month, will accelerate to 150 to 200 a year, according to ADS.

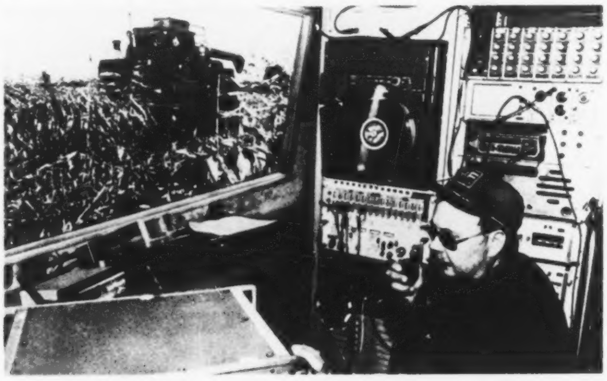
Massey Talks About Combine It's Testing

Massey-Ferguson has released some information about a developmental combine, which, it claims, is averaging 25 per cent more productivity than comparable standard models. Dick Jones of MF's Electronic Center, says it is equipped with "several microcomputers, a combine information center, and a sophisticated electronics system."

The four main physical systems on it are: forward speed control, which adjusts automatically to varying crop densities; automatic header height systems more sensitive than contemporary ones; an operator information center to display harvesting performance results and grain loss figures; and an automatic guidance system that steers the combine by measuring the position of the table head in relation to the crop.

Jones says the experimental unit is "some few years from the market."

The view is of a mobile data collection lab during field tests. Information comes from 30 sensors on the combine.



Irv Aal Moves From New Holland To IH Ag Group

Irvin E. Aal has joined International Harvester's Agricultural Equipment Group as senior vice-president in charge of product management, engineering, marketing and sales, according to Jack D. Michaels, group president.

Aal had been vice-president and general manager of Sperry New Holland's North American Div. and had been with that company for 21 years. Other recent assignments for New Holland had been director of marketing for the European Div. (1979) and vice-president of worldwide marketing and public affairs (1980).

Briefly...

Deutz Corp.'s Ag Equipment Div. is testing all-wheel-drive tractors with both front and rear three-point hitch and pto at several locations in North America, the company says. According to Deutz, such front and rear mounting of equipment is common in Germany.

International Harvester has closed its Canton, Ill., plant, which made farm equipment parts. Operations have been shifted to plants in Hamilton, Ont., and East Moline, Ill.

Prior to the Winter Meeting of the American Society of Agricultural Engineers at Chicago's Hyatt Regency Dec. 13-16, two major conferences are scheduled. One is "Agricultural Electronics, 1983 and Beyond," Dec. 11-13. Registration is $135 in advance, $150 at the conference. The other is "Technical Sales Management and Forecasting," Dec. 12. Registration is $115 ($95 for ASAE members). For more information, contact Cathy Ziegert, ASAE, 2950 Niles Rd., St. Joseph, Mich. 49085, telephone 616/429-0300.

Ford Tractor has established a national agricultural women's council made up of representatives from 10 leading farm organizations. According to J.N. Chuchman, North American marketing manager, "The council will be the communications link between Ford tractor executives and women in agriculture."

Editor's Notebook

(continued)

Dittamore's idea, actually) strikes you as full of holes, too risky, dumb, impossible or whatever, then try something else.

Hook your in-house computer up with the farmer's table-top computer by phone so he can order parts from his house at 11 p.m. Sunday and get delivery by Monday noon. If that's just too fanciful, then design a coordinated operation in which you telemarket parts and put a parts van into the countryside. Or open your own little parts outlet in that tiny hamlet 30 miles down the road and take some business away from those new competitors.

Or don't do any of those things. But for Pete's sake, don't just sit there. **Do something.**

How Devoutly Do You Read The Book of Numbers?

For some people, the arrival of a publication's annual statistical issue is guaranteed to produce a glaze over the eyes worthy of a Winchell's donut. For others, the heartbeat quickens. Business stops while they go through the pages.

Well, whichever camp you're in, here's I&T's 46th Annual Statistical Issue. Over the years, I have become very fond of industry statistics as I have developed an understanding of what they actually represent. A baseball fan loves the game's statistics because he can visualize that they deal with flesh-and-blood action—guys sliding into second, curve balls nipping the edge of the plate, line shots off the Wrigley Field vines.

And for many of us, the numbers of this business tell other stories of human endeavor. Changes in export and import numbers, increases and decreases in retail sales, or even the constancy of equipment on farms are all records of human effort in this vital industry.

Consider, just for example, manufacturers' shipments of corn heads. "Shipments" means completed products leaving the factory gate. Retail sales are something else. Anyway, the industry shipped 18,000 corn heads in 1978; 20,000 in 1979; 14,600 in 1980; 17,100 in 1981 and—pow—7,200 last year! It's very reflective of an industry that has become overloaded with inventory of this product.

When it comes to export and import numbers, the stories told by the numbers may be a little bit colored by this fact: Since there is no import tariff on farm equipment in most nations of the world, it may be of advantage to some importers to call something "farm equipment" on the official documents. If it gets past the customs agent, they don't pay duty—and data for that particular product are blurred a bit.

For instance, the numbers indicate that the U.S. exported *$93 million* in agricultural spray equipment, including parts, to Saudi Arabia in the first half of 1983. Since there were only 1,199 *units* included, we're looking at a huge quantity of parts. Yes, I know about the existence of some massive agricultural projects in that nation, but since they brought in only $17 million in U.S. tractors and tractor parts in the same period, I'm skeptical about that $93 million figure.

Nevertheless, the numbers in our 46th Market Statistics Issue provide the trend information that many, many readers need. "How many tractors *are* there on farms in Illinois?" asks the researcher. He needs to know because his company markets certain tractor attachments. "How many tractors came in from Italy?" asks another, trying to get a bead on what his competition has been doing.

And for others, there's simply the interest of the industry numbers buff. I'm one of them and so are many of you. Welcome.

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT CO.
Dothan, Alabama
September 13, 1983

ALLIS-CHALMERS TRACTORS

D17, 1962 (Rough)	550
G, 1949 (Fair)	850*

DAVID BROWN TRACTORS

990 diesel, 1966 (Fair)	750
990 diesel, 1966 (Fair)	685

MASSEY-FERGUSON TRACTORS

1085 diesel, 1977 (Fair)	4250
1080 diesel, 1971 (Rough)	1800
1080 diesel, 1970 (Fair)	3350
1080 diesel, 1970 (Fair)	2800
285 diesel, 1978 (Good)	6550
245 diesel, 1979 (Good)	6000
240 diesel, (Excellent)	7750*
203, Idr., 1964 (Good)	3200
175 diesel, 1970 (Good)	3500
3165 diesel, 1968 (Rough)	1725*
165 diesel, 1968 (Good)	3300
165 diesel, 1967 (Good)	3600
165 diesel, 1967 (Good)	3550*
165 diesel, 1966 (Fair)	2700
150 diesel, 1965 (Excellent)	3600
135, 1975 (Fair)	2600
135, 1972 (Excellent)	3500
135, 1970 (Good)	2900*
135, 1970 (Excellent)	3800*
135 diesel, 1969 (Excellent)	3500
135 diesel, 1968 (Good)	3200*
135 diesel, 1967 (Fair)	2650*
135, 1968 (Rough)	1700*
135 diesel, 1968 (Excellent)	4200
65 diesel, 1964 (Rough)	1125
65 diesel, 1963 (Good)	1800*
50, 1959 (Fair)	1425
35, 1963 (Rough)	1150*
35 diesel, 1962 (Excellent)	2450
35, 1962 (Good)	2000
35 diesel, 1962 (Fair)	1550
35, 1960 (Good)	1850
35, 1956 (Good)	2000*
TO30, 1953 (Good)	950*

FORD TRACTORS

9600 diesel, 1975 (Rough)	3350
8000 diesel, 1969 (Good)	3900
7000 diesel, 1975 (Fair)	3650
7000 diesel, 1975 (Good)	5400
5600 diesel, 1976 (Good)	5750*
5000 diesel, 1973 (Good)	4256*
5000 diesel, 1972 (Good)	4600
5000 diesel, 1973 (Good)	4800
5000 diesel, 1972 (Excellent)	5100*
4600 diesel, 1977 (Excellent)	7600
4000 diesel, 1974 (Excellent)	5100
4000 diesel, 1966 (Fair)	2375
3000 diesel, 1974 (Excellent)	4100*
3000 diesel, 1974 (Good)	3100
3000 diesel, 1969 (Rough)	1800
3000 diesel, 1968 (Good)	3100*
3000 diesel, 1968 (Good)	3200*
3000, 1966 (Good)	2850
3000 diesel, 1966 (Rough)	2300
3000 diesel, 1969 (Good)	3150
2000, 1963 (Rough)	1200*
Sup. Maj. diesel, 1963 (Rough)	1350
961, 1960 (Fair)	1250
841, 1958 (Rough)	900
861 diesel, 1958 (Excellent)	2750
641, 1960 (Good)	2200
640, 1955 (Good)	1950
Sup. Dexta 1963 (Good)	2150
Dexta, 1959 (Fair)	900
8N, 1952 (Good)	1550
8N, 1951 (Good)	1700
8N, 1951 (Good)	1590
8N, 1950 (Good)	1600*
8N, 1950 (Good)	1650
8N, 1950 (Good)	1500
8N, 1948 (Fair)	1150

INTERNATIONAL HARVESTER TRACTORS

656 diesel, 1970 (Fair)	3500
656 diesel, 1968 (Fair)	3100*
656 diesel, 1966 (Rough)	2450*
655 diesel, (Rough)	1150
574 diesel, 1973 (Good)	3800*
404, 1964 (Good)	1700
B275, 1958 (Fair)	1000
200, 1955 (Rough)	650
200, 1955 (Rough)	600
M, 1944 (Rough)	310
Sup. A, 1948 (Good)	850*
185 Cub Loboy, mo., 1975 (Good)	2000*
Cub, cult., plt., plow, 1949 (Good)	1150

JOHN DEERE TRACTORS

5020 diesel, 1968 (Rough)	2350
4630 diesel, 1976 (Excellent)	10,500

(Continued on page 60)

Write in (4) on Reply Card⟶

Motor Vehicles and Specified Machines on U.S. Farms and Average Prices of Wheel Tractors, January 1, Designated Years[1]

Year	Tractors (exclusive of steam & garden)[2] Thousands	Motor Trucks Thousands	Grain Combines Thousands	Corn Pickers and Picker Shellers Thousands	Pick-up Balers Thousands	Field Forage Harvesters Thousands	Garden Tractors and Motor Tillers[3] Thousands	Wheel Tractors Wholesale Prices[4]	
								Per Unit Dollars	Horsepower Dollars
1927	693	662	.....	.....	.....	.....	.....	.....	.....
1928	782	753	.....	.....	.....	.....	.....	.....	.....
1929	827	840	.....	.....	.....	.....	.....	.....	.....
1930	920	900	61	50	.....	.....	.....	.....	.....
1931	997	920	.....	.....	.....	.....	.....	.....	.....
1932	1,022	910	.....	.....	.....	.....	.....	.....	.....
1933	1,019	865	.....	.....	.....	.....	.....	.....	.....
1934	1,016	875	.....	.....	.....	.....	.....	.....	.....
1935	1,048	890	.....	.....	.....	.....	.....	.....	.....
1936	1,125	923	.....	.....	.....	.....	.....	.....	.....
1937	1,230	990	.....	.....	.....	.....	.....	.....	.....
1938	1,370	1,042	.....	.....	.....	.....	.....	.....	.....
1939	1,445	1,020	.....	.....	.....	.....	.....	.....	.....
1940	1,545	1,047	190	110	.....	.....	.....	.....	.....
1941	1,675	1,095	225	120	.....	.....	.....	.....	.....
1942	1,885	1,160	275	130	25	.....	.....	.....	.....
1943	2,100	1,280	320	138	31	.....	.....	$ 579	$ 21
1944	2,215	1,385	345	146	34	.....	.....	$ 658	$ 24
1945	2,354	1,490	275	168	42	20	68	$ 665	$ 25
1946	2,480	1,550	420	203	54	25	80	$ 733	$ 28
1947	2,613	1,700	465	236	65	30	122	$ 783	$ 30
1948	2,821	1,900	535	299	90	45	159	$ 890	$ 33
1949	3,123	2,065	620	372	135	60	192	$ 994	$ 35
1950	3,399	2,209	714	456	196	81	216	$ 1,073	$ 37
1951	3,678	2,310	810	522	240	102	242	$ 1,234	$ 42
1952	3,907	2,410	887	588	298	124	268	$ 1,297	$ 42
1953	4,100	2,520	930	630	345	148	296	$ 1,359	$ 39
1954	4,243	2,610	965	660	395	175	315	$ 1,513	$ 39
1955	4,345	2,675	980	688	448	202	332	$ 1,554	$ 39
1956	4,480	2,707	1,005	715	505	220	353	$ 1,682	$ 41
1957	4,570	2,745	1,015	740	560	240	375	$ 1,842	$ 41
1958	4,620	2,775	1,030	755	600	258	400	$ 2,111	$ 46
1959	4,673	2,800	1,045	775	645	270	425	$ 2,189	$ 48
1960	4,688	2,834	1,042	792	680	291	450	$ 2,338	$ 49
1961	4,743	2,850	980	740	685	291	468	$ 2,578	$ 50
1962	4,763	2,885	960	730	703	300	485	$ 2,819	$ 51
1963	4,778	2,925	940	720	718	307	500	$ 3,046	$ 53
1964	4,786	2,970	920	705	734	312	513	$ 3,443	$ 53
1965	4,787	3,030	910	690	751	316	699	$ 3,541	$ 56
1966	4,783	3,017	888	686	752	316	725	$ 3,886	$ 58
1967	4,786	3,009	867	680	748	319	750	$ 4,257	$ 62
1968	4,766	3,016	847	673	739	321	770	$ 4,709	$ 66
1969	4,712	3,004	820	657	725	314	790	$ 4,976	$ 71
1970	4,619	2,978	790	635	708	304	805	$ 5,560	$ 76
1971	4,562	2,985	760	629	698	309	815	$ 6,190	$ 80
1972	4,509	2,993	725	625	687	315	825	$ 6,486	$ 84
1973	4,477	3,006	703	618	680	324	835	$ 6,953	$ 85
1974	4,478	3,020	685	618	677	332	850	$ 7,294	$ 86
1975	4,463	3,032	666	615	666	337	870	$ 8,459	$ 91
1976	4,434	3,043	647	610	642	342	890	$11,220	$112
1977	4,381	3,052	630	605	614	346	905	$12,692	$124
1978	4,350	3,054	615	600	595	345	917	$13,431	$144
1979	4,990	3,555	664	694	769	376	1,060	$16,512	$149
1980	4,960	3,566	677	690	761	381	1,075	$18,139	$166
1981	4,925	3,577	690	685	752	386	1,085	$23,308	$199
1982	4,855	3,585	698	680	742	388	1,090	$25,941	$204
1983	4,815	3,594	703	674	732	390	1,090	$33,647	$234

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[1] SOURCE: Reports of the USDA and the Bureau of the Census. After 1959, Alaska and Hawaii are included. On-farm data after 1970, except 1975 and 1979, are estimated by I&T.

[2] Consists of Wheel and Crawler Tractors only after 1944. Prior to 1945 some Garden Tractors may have been included but the number was small.

[3] Motor Tillers included after 1964.

[4] Estimated at wholesale level by dividing **Value of Manufacturers' Shipments** by **Units Shipped** and by **Maximum Belt Horsepower**, data are published in "Current Industrial Reports" of the Bureau of the Census.

Note: Data from the 1978 Census (Jan. 1, 1979 above) and later years, reflect changes in data collection, resulting in improved coverage by the Census and are not fully comparable with earlier years.

Principal Machines on Farms — 1983

STATE	WHEEL AND CRAWLER TRACTORS 1959 Census Number	1964 Census Number	1969 Census Number	1974 Census Number	1978[1] Census Number	Estimated July 1, 1983 Number	TRACTOR MOLDBOARD PLOWS Estimated July 1, 1958 Number	Estimated July 1, 1983 Number
Maine	17,793	16,290	14,252	13,493	15,064	15,300	12,400	8,870
New Hampshire	6,605	6,253	4,953	4,989	5,584	6,100	4,600	2,770
Vermont	16,669	16,333	15,227	14,706	16,322	16,140	10,200	9,660
Massachusetts	12,068	11,575	9,537	9,341	10,902	11,500	8,800	5,930
Rhode Island	1,651	1,687	1,359	1,359	1,684	1,720	1,000	830
Connecticut	11,219	9,963	8,679	7,924	9,169	9,230	7,700	5,460
New York	138,670	136,304	122,645	118,313	128,248	127,800	107,000	79,500
New Jersey	24,726	22,042	19,984	19,324	22,991	22,650	21,500	17,000
Pennsylvania	144,759	144,149	126,810	124,251	142,844	144,500	118,600	98,300
Delaware	8,259	7,992	7,555	7,631	8,720	8,660	6,700	6,480
Maryland	37,291	37,203	34,174	34,705	40,699	40,900	30,500	28,200
NORTHEAST	**419,710**	**409,791**	**365,175**	**356,036**	**402,227**	**404,500**	**329,000**	**263,000**
Ohio	204,681	199,694	194,962	188,580	205,972	199,200	161,000	162,200
Indiana	186,853	181,086	174,055	167,382	183,002	177,000	149,000	144,000
Illinois	290,002	287,480	275,203	272,093	285,773	281,400	210,000	186,000
Iowa	327,863	329,172	318,938	317,052	328,292	320,000	235,000	219,500
Missouri	191,512	198,095	201,513	189,672	205,572	198,400	135,000	150,400
CORN BELT	**1,200,911**	**1,195,527**	**1,164,731**	**1,134,779**	**1,208,611**	**1,176,000**	**890,000**	**862,100**
Michigan	169,782	169,920	152,741	143,569	157,697	150,000	139,000	131,000
Wisconsin	234,387	247,427	229,752	237,457	258,119	256,100	171,000	168,100
Minnesota	275,833	284,887	258,614	260,535	282,533	278,400	210,000	185,700
LAKE STATES	**680,002**	**702,234**	**641,107**	**641,561**	**698,349**	**684,500**	**520,000**	**484,800**
North Dakota	121,039	122,056	118,069	123,072	121,966	121,200	84,000	70,200
South Dakota	115,639	120,100	111,532	114,456	112,782	109,500	84,000	70,300
Nebraska	175,254	180,423	166,098	170,423	177,691	176,200	108,000	97,000
Kansas	173,651	174,185	163,180	161,276	160,479	158,100	123,000	97,800
GREAT PLAINS	**585,764**	**596,764**	**558,879**	**569,317**	**572,918**	**565,000**	**399,000**	**335,300**
West Virginia	21,995	23,926	23.842	23,265	27,951	27,900	15,400	18,200
Kentucky	103,415	118,404	137,105	129,069	164,862	160,000	71,000	104,500
Tennessee	97,800	108,319	122,528	110,941	130,031	124,700	43,000	65,900
Virginia	75,143	78,989	79,347	76,121	90,284	88,200	52,000	62,500
North Carolina	140,639	149,850	150,825	130,140	152,917	141,800	57,600	72,500
APPALACHIAN	**438,992**	**479,488**	**513,647**	**469,536**	**566,045**	**542,600**	**239,000**	**323,600**
South Carolina	48,637	50,931	50,115	45,321	53,627	51,300	9,200	13,300
Georgia	89,392	89,049	84,366	77,067	85,049	82,900	23,500	33,700
Florida	35,820	41,295	42,958	44,192	57,226	61,000	12,300	20,300
Alabama	67,559	71,925	75,069	68,521	75,398	72,700	20,500	25,200
SOUTHEAST	**241,408**	**253,200**	**252,508**	**235,101**	**271,300**	**267,900**	**65,500**	**92,500**
Mississippi	84,425	90,347	88,677	76,808	80,964	77,200	29,700	32,500
Louisiana	53,229	60,618	63,194	55,933	64,337	63,200	15,400	22,700
Arkansas	83,852	90,993	86,977	78,083	89,421	87,700	41,900	50,300
DELTA STATES	**221,506**	**241,958**	**238,848**	**210,824**	**234,722**	**228,100**	**87,000**	**105,500**
Oklahoma	102,323	101,605	102,397	91,661	105,795	101,500	74,000	82,100
Texas	268,233	269,519	282,088	251,687	280,102	274,000	74,500	90,300
SOUTHERN PLAINS	**370,556**	**371,124**	**384,485**	**343,348**	**385,897**	**375,500**	**148,500**	**172,400**
Montana	59,510	61,832	58,729	58,457	55,941	58,300	30,500	28,000
Idaho	56,961	58,607	54,091	55,419	55,392	59,800	40,000	37,300
Wyoming	20,737	21,596	20,925	20,801	19,756	19,800	15,400	14,650
Colorado	64,051	63,906	59,112	58,091	59,959	60,800	34,000	28,500
New Mexico	17,146	17,919	15,998	17,021	17,546	18,120	11,300	8,700
Arizona	13,443	13,747	12,136	13,812	12,749	14,500	4,200	3,450
Utah	21,803	22,256	20,128	21,110	22,206	23,400	17,500	15,500
Nevada	5,297	5,557	5,318	5,515	5,453	5,780	3,100	2,700
MOUNTAIN STATES	**258,948**	**265,420**	**246,437**	**250,226**	**249,002**	**260,500**	**156,000**	**138,800**
Washington	63,114	65,813	58,600	59,542	58,190	67,700	42,000	40,300
Oregon	56,732	58,741	51,223	52,651	52,283	59,100	44,000	37,900
California	147,390	142,812	138,914	140,393	136,256	164,600	70,000	67,800
PACIFIC	**267,236**	**267,366**	**248,737**	**252,586**	**246,729**	**291,400**	**156,000**	**146,000**
TOTAL	**4,684,852**	**4,782,872**	**4,614,554**	**4,463,314**	**4,835,800**	**4,796,000**	**2,990,000**	**2,924,000**

[1] Only wheel tractors are included in the 1978 Census.

Principal Machines on Farms — 1983

	COMBINES[1]					CORN HEADS FOR COMBINES[2]			
STATE	1964 Census Number	1969 Census Number	1974 Census Number	1978 Census Number	Estimated July 1, 1983 Number	1969 Census Number	1974 Census Number	1978 Census Number	Estimated July 1, 1983 Number
Maine	875	218	242	415	420	120	141	192	190
New Hampshire	27	8	5	18	15	65	55	64	55
Vermont	344	113	87	170	160	175	238	375	400
Massachusetts	70	34	35	47	45	84	103	113	115
Rhode Island	20	5	7	15	15	21	10	23	20
Connecticut	77	40	15	86	70	92	85	157	150
New York	16,536	4,902	5,114	5,994	6,125	1,706	2,344	3,576	4,070
New Jersey	1,726	634	766	1,226	1,250	269	324	671	690
Pennsylvania	23,939	6,777	7,297	9,851	10,000	1,924	2,636	4,443	5,020
Delaware	1,780	979	1,127	1,351	1,390	566	681	1,035	1,060
Maryland	5,237	2,604	2,740	3,610	3,750	1,555	1,954	2,799	3,150
NORTHEAST	**50,631**	**16,314**	**17,435**	**22,783**	**23,240**	**6,577**	**8,571**	**13,448**	**14,920**
Ohio	50,291	20,805	26,009	33,996	35,700	11,892	17,515	24,522	27,400
Indiana	46,395	23,871	29,485	37,695	40,800	17,920	24,616	32,737	36,800
Illinois	80,857	48,116	55,085	63,650	69,500	37,649	46,362	56,213	62,500
Iowa	86,178	28,221	42,117	55,889	65,900	22,302	37,864	53,427	63,600
Missouri	44,535	24,208	26,253	34,029	35,700	16,112	18,278	23,544	24,500
CORN BELT	**308,256**	**145,221**	**178,949**	**225,259**	**247,600**	**105,875**	**144,635**	**190,443**	**214,800**
Michigan	41,360	13,053	14,649	19,474	20,400	4,306	7,098	11,333	13,150
Wisconsin	45,516	10,859	13,392	18,553	20,000	3,566	5,147	8,589	10,250
Minnesota	71,748	27,189	35,033	45,225	50,400	12,102	18,780	27,390	31,900
LAKE STATES	**158,624**	**51,101**	**63,074**	**83,252**	**90,800**	**19,974**	**31,025**	**47,312**	**55,300**
North Dakota	41,782	26,952	27,273	31,112	30,100	753	864	1,619	1,780
South Dakota	28,289	11,926	13,941	16,587	17,900	3,483	5,386	7,759	9,000
Nebraska	43,205	25,730	29,224	35,147	37,800	13,370	18,578	24,687	28,100
Kansas	59,813	41,601	41,871	47,650	48,200	6,533	8,038	9,282	9,900
GREAT PLAINS	**173,089**	**107,209**	**112,309**	**130,496**	**134,000**	**24,139**	**32,866**	**43,347**	**48,780**
West Virginia	1,020	245	307	479	480	147	199	265	300
Kentucky	9,737	4,565	6,329	10,760	11,750	3,196	4,390	8,510	9,150
Tennessee	11,537	5,773	6,843	10,952	11,750	2,458	2,734	5,634	5,800
Virginia	9,281	3,769	4,309	6,150	6,170	2,243	2,972	4,487	4,850
North Carolina	14,847	7,982	8,828	13,535	14,300	5,279	6,696	10,671	11,850
APPALACHIAN	**46,422**	**22,334**	**26,616**	**41,876**	**44,450**	**13,323**	**16,991**	**29,567**	**31,950**
South Carolina	7,085	4,483	4,706	6,609	6,770	1,803	2,285	3,931	4,150
Georgia	9,177	5,408	6,255	9,924	10,900	4,036	4,836	7,637	8,080
Florida	1,230	1,010	1,182	1,792	1,980	584	773	1,207	1,240
Alabama	4,806	3,423	3,988	6,958	7,460	1,635	1,858	3,468	3,580
SOUTHEAST	**22,298**	**14,324**	**16,131**	**25,283**	**27,110**	**8,058**	**9,752**	**16,243**	**17,050**
Mississippi	6,099	6,977	6,893	10,190	10,550	441	310	593	610
Louisiana	5,145	6,414	7,034	9,715	10,300	357	231	403	350
Arkansas	13,086	12,657	11,484	14,095	14,250	294	725	292	300
DELTA STATES	**24,330**	**26,048**	**25,411**	**34,000**	**35,100**	**1,092**	**1,266**	**1,288**	**1,260**
Oklahoma	21,668	14,909	14,797	18,006	17,800	457	511	900	930
Texas	31,355	21,223	19,394	23,742	23,300	1,743	1,858	3,684	4,020
SOUTHERN PLAINS	**53,023**	**36,132**	**34,191**	**41,748**	**41,100**	**2,200**	**2,369**	**4,584**	**4,950**
Montana	16,011	11,687	11,392	13,225	13,450	121	107	101	105
Idaho	11,330	7,639	8,113	10,180	10,600	202	252	458	490
Wyoming	2,962	1,523	1,690	2,017	2,110	112	149	180	210
Colorado	11,062	6,937	7,338	8,488	8,950	1,032	1,632	2,397	2,800
New Mexico	1,898	1,041	1,229	1,541	1,640	52	117	246	270
Arizona	559	412	530	513	590	25	23	70	70
Utah	2,421	1,442	1,442	1,748	1,800	134	196	186	200
Nevada	277	201	253	269	280	9	21	3	5
MOUNTAIN STATES	**46,520**	**30,882**	**31,987**	**37,981**	**39,420**	**1,687**	**2,497**	**3,641**	**4,150**
Washington	9,706	6,891	7,330	8,471	9,050	307	269	490	510
Oregon	8,372	5,107	5,266	6,442	6,630	167	106	185	180
California	8,366	5,619	5,373	6,492	6,500	633	696	1,085	1,150
PACIFIC	**26,444**	**17,617**	**17,969**	**21,405**	**22,180**	**1,107**	**1,071**	**1,760**	**1,840**
TOTAL	**909,637**	**467,182**	**524,072**	**664,083**	**705,000**	**184,032**	**251,043**	**351,633**	**395,000**

[1] The Census in 1964 included self-propelled ano pull types. The Census in 1969, 1974, 1978 and the estimated number for July 1, 1983 cover only self-propelled combines.

[2] The Census in 1969 included only corn heads on class 1-5 farms ($2,500or more of income). The Census in 1974, 1978 and the estimated number for July 1, 1983 cover all farms.

Principal Machines on Farms – 1983

	PICK-UP BALERS					FIELD FORAGE HARVESTERS[1]				
STATE	1964 Census Number	1969 Census Number	1974 Census Number	1978 Census Number	Estimated July 1, 1983 Number	1964 Census Number	1969 Census Number	1974 Census Number	1978 Census Number	Estimated July 1, 1983 Number
Maine	3,339	2,446	2,255	2,770	2,660	998	712	914	1,341	2,100
New Hampshire	1,681	1,266	1,197	1,448	1,420	747	385	612	553	710
Vermont	5,796	4,171	3,975	4,434	4,280	2,358	1,542	2,328	2,798	3,800
Massachusetts	2,343	1,774	1,600	1,900	1,800	1,412	744	923	1,185	1,600
Rhode Island	250	171	172	209	200	233	88	122	138	170
Connecticut	1,971	1,604	1,313	1,715	1,520	1,561	788	777	831	1,020
New York	38,107	31,074	27,495	30,762	28,700	20,710	13,815	17,363	20,891	27,700
New Jersey	3,073	2,357	2,066	2,458	2,210	2,181	1,171	1,127	1,255	1,430
Pennsylvania	41,873	35,571	32,195	38,745	36,700	20,794	12,240	15,485	19,187	28,100
Delaware	664	609	628	618	590	475	245	422	282	380
Maryland	6,845	5,750	5,159	6,083	5,700	3,961	2,177	2,603	2,943	4,340
NORTHEAST	**105,942**	**86,793**	**78,055**	**91,142**	**85,780**	**55,430**	**33,907**	**42,678**	**51,404**	**71,350**
Ohio	43,607	40,101	36,137	39,170	36,200	11,759	7,788	9,757	11,419	16,800
Indiana	25,459	23,414	21,705	24,655	23,000	7,523	5,344	6,121	6,912	9,700
Illinois	38,163	33,291	29,822	31,487	28,800	16,295	10,130	11,333	11,905	15,500
Iowa	60,111	55,456	47,461	47,729	42,000	20,937	14,245	17,179	19,479	26,500
Missouri	36,265	38,929	38,487	44,886	43,000	9,315	6,884	7,430	8,786	9,900
CORN BELT	**203,605**	**191,191**	**173,612**	**187,927**	**173,000**	**65,829**	**44,391**	**51,820**	**58,501**	**78,400**
Michigan	31,502	26,915	23,897	26,039	23,700	15,077	8,986	11,682	12,986	17,150
Wisconsin	63,921	56,939	54,962	59,847	57,800	48,149	27,199	38,341	43,574	60,900
Minnesota	55,896	51,600	46,689	50,534	46,800	26,024	17,761	20,825	23,437	29,800
LAKE STATES	**151,319**	**135,454**	**125,548**	**136,420**	**128,300**	**89,250**	**53,946**	**70,848**	**79,997**	**107,850**
North Dakota	15,823	15,623	14,831	15,380	14,300	9,555	6,614	5,911	5,539	5,900
South Dakota	14,441	14,657	13,835	14,258	13,200	10,810	9,755	11,254	11,364	12,200
Nebraska	19,907	18,988	17,309	17,160	15,600	13,268	11,232	12,632	13,935	15,950
Kansas	28,086	27,464	26,846	29,550	28,100	17,035	11,712	10,651	10,844	11,550
GREAT PLAINS	**78,257**	**76,732**	**72,821**	**76,348**	**71,200**	**50,668**	**39,313**	**40,448**	**41,682**	**45,600**
West Virginia	7,362	8,013	7,444	10,051	9,400	1,155	1,143	1,478	2,134	2,650
Kentucky	21,476	24,121	23,536	32,538	31,100	3,157	3,621	4,400	8,269	9,600
Tennessee	15,234	17,686	17,090	22,597	21,900	3,002	2,953	3,602	5,579	6,720
Virginia	16,105	16,035	15,285	19,222	18,300	4,450	4,181	4,675	6,343	7,370
North Carolina	10,322	10,053	10,115	12,591	12,300	3,365	2,695	3,841	4,317	5,140
APPALACHIAN	**70,499**	**75,908**	**73,470**	**96,999**	**93,000**	**15,129**	**14,593**	**17,996**	**26,642**	**31,480**
South Carolina	4,468	3,857	3,719	4,763	4,630	1,139	887	1,075	1,381	1,770
Georgia	6,917	7,118	6,678	8,909	8,660	1,696	1,455	1,722	2,652	3,470
Florida	1,419	1,692	1,910	2,885	2,800	543	447	629	916	1,400
Alabama	6,231	7,227	7,662	10,393	10,300	1,233	1,250	1,513	2,158	2,660
SOUTHEAST	**19,035**	**19,894**	**19,969**	**26,950**	**26,390**	**4,611**	**4,039**	**4,939**	**7,107**	**9,300**
Mississippi	6,618	7,045	7,431	8,752	8,550	1,697	1,531	2,130	2,168	2,540
Louisiana	5,064	4,831	4,594	6,192	5,900	775	763	872	1,872	2,140
Arkansas	6,456	7,500	8,040	11,022	10,750	1,181	1,014	1,047	1,882	2,160
DELTA STATES	**18,138**	**19,376**	**20,065**	**25,966**	**25,200**	**3,653**	**3,308**	**4,049**	**5,922**	**6,840**
Oklahoma	12,965	14,246	14,432	20,032	19,700	2,820	1,872	1,740	2,420	2,770
Texas	15,737	18,208	18,534	28,338	28,600	4,643	3,556	3,215	5,451	6,250
SOUTHERN PLAINS	**28,702**	**32,454**	**32,966**	**48,370**	**48,300**	**7,463**	**5,426**	**4,955**	**7,871**	**9,020**
Montana	11,458	11,059	10,613	11,857	11,400	1,736	1,695	1,512	2,130	2,450
Idaho	13,072	12,057	12,048	13,043	13,000	2,696	1,907	2,048	2,435	2,920
Wyoming	4,259	4,357	4,383	4,572	4,570	1,086	924	995	1,267	1,550
Colorado	9,600	9,504	9,505	10,564	10,660	5,252	3,744	3,755	4,418	5,170
New Mexico	2,340	2,532	2,833	3,427	3,520	560	490	591	786	1,000
Arizona	1,001	860	1,018	1,081	1,100	556	281	314	341	520
Utah	6,389	5,887	5,957	7,171	7,200	1,989	1,378	1,560	1,909	2,330
Nevada	1,264	1,177	1,299	1,524	1,530	291	189	233	367	500
MOUNTAIN STATES	**49,383**	**47,433**	**47,656**	**53,239**	**52,980**	**14,166**	**10,608**	**11,008**	**13,653**	**16,440**
Washington	9,759	8,658	8,215	9,327	9,300	3,734	1,837	2,234	3,019	5,250
Oregon	8,007	7,218	7,195	9,207	9,140	2,419	1,532	1,496	2,718	3,780
California	8,389	6,829	6,435	6,832	6,410	3,189	1,666	2,006	2,628	4,690
PACIFIC	**26,155**	**22,705**	**21,845**	**25,366**	**24,850**	**9,342**	**5,035**	**5,736**	**8,365**	**13,720**
TOTAL	**751,035**	**707,940**	**666,007**	**768,727**	**729,000**	**315,541**	**214,568**	**254,475**	**301,144**	**390,000**

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[1] The Census in 1964 and the estimated number for July 1, 1983 include shear-bar and flail types. The Census in 1969, 1974 and 1978 covered only shear-bar harvesters.

Principal Machines on Farms – 1983

STATE	POWER TRACTOR MOWERS (Cutter bar type only)		SIDE DELIVERY RAKES		MOWER CONDITIONERS[1]		
	Estimated July 1, 1968 Number	Estimated July 1, 1983 Number	Estimated July 1, 1968 Number	Estimated July 1, 1983 Number	1974 Census Number	1978 Census Number	Estimated July 1, 1983 Number
Maine	9,000	7,350	10,000	6,380	1,378	2,092	2,570
New Hampshire	4,400	3,360	5,000	2,710	605	1,029	1,230
Vermont	10,000	9,800	10,300	7,980	2,776	4,104	5,260
Massachusetts	5,800	4,370	6,000	3,820	1,048	1,568	1,850
Rhode Island	550	380	500	340	102	144	160
Connecticut	4,500	3,850	4,000	2,700	786	1,234	1,560
New York	55,000	61,000	61,000	50,400	18,701	26,674	33,400
New Jersey	7,000	4,980	8,000	4,330	1,636	2,518	2,600
Pennsylvania	60,000	67,500	67,000	53,200	20,428	30,551	35,300
Delaware	1,750	1,200	2,200	1,110	525	603	830
Maryland	14,000	12,500	13,000	9,760	3,614	4,944	5,750
NORTHEAST	**172,000**	**176,290**	**187,000**	**142,730**	**51,599**	**75,461**	**90,510**
Ohio	70,000	71,700	86,000	61,600	20,268	28,007	33,500
Indiana	64,000	56,300	71,000	45,300	12,503	16,162	20,600
Illinois	106,000	78,800	86,000	59,100	18,793	21,817	29,200
Iowa	115,000	117,500	127,000	99,000	19,636	26,631	34,200
Missouri	80,000	94,000	50,000	58,000	17,228	24,047	32,400
CORN BELT	**435,000**	**418,300**	**420,000**	**323,000**	**88,428**	**116,664**	**149,900**
Michigan	48,000	54,000	85,000	47,600	15,924	22,066	25,600
Wisconsin	93,000	116,000	115,000	99,200	36,232	52,723	66,300
Minnesota	96,000	107,500	108,000	96,500	22,979	32,101	38,200
LAKE STATES	**237,000**	**277,500**	**308,000**	**243,300**	**75,135**	**106,890**	**130,100**
North Dakota	42,000	45,000	26,000	25,300	5,971	6,395	8,500
South Dakota	44,000	52,400	31,000	25,800	4,445	5,715	6,260
Nebraska	61,000	62,000	41,000	39,300	9,225	15,128	15,350
Kansas	62,000	61,600	42,000	40,700	9,247	17,520	17,200
GREAT PLAINS	**209,000**	**221,000**	**140,000**	**131,100**	**28,888**	**44,758**	**47,310**
West Virginia	14,000	20,700	8,000	10,800	3,484	5,401	5,800
Kentucky	48,000	55,800	28,000	35,000	14,718	24,497	25,900
Tennessee	47,000	59,900	25,500	27,700	12,037	17,526	20,570
Virginia	28,000	36,800	25,500	27,000	8,714	13,099	15,800
North Carolina	27,000	36,100	15,000	18,000	6,824	10,767	11,300
APPALACHIAN	**164,000**	**209,300**	**102,000**	**118,500**	**45,777**	**71,290**	**79,370**
South Carolina	12,500	11,560	7,500	6,790	2,471	3,612	4,150
Georgia	23,000	20,500	12,000	12,050	6,383	9,451	9,950
Florida	7,500	4,350	2,200	2,170	4,000	7,114	5,970
Alabama	19,000	19,500	7,300	8,600	5,367	8,834	8,520
SOUTHEAST	**62,000**	**55,910**	**29,000**	**29,610**	**18,221**	**29,011**	**28,590**
Mississippi	21,000	25,000	5,000	11,200	5,282	8,041	8,220
Louisiana	12,000	12,600	6,000	7,070	4,421	7,396	6,400
Arkansas	24,000	24,100	12,000	11,900	5,521	8,653	10,350
DELTA STATES	**57,000**	**61,700**	**23,000**	**30,170**	**15,224**	**24,090**	**24,970**
Oklahoma	37,000	37,100	22,000	22,500	7,703	15,717	14,800
Texas	48,000	54,100	21,000	26,000	19,487	34,266	34,400
SOUTHERN PLAINS	**85,000**	**91,200**	**43,000**	**48,500**	**27,190**	**49,983**	**49,200**
Montana	23,000	24,700	15,000	15,800	3,205	7,513	4,910
Idaho	27,000	24,500	23,000	18,800	3,367	9,282	5,220
Wyoming	10,500	7,000	6,000	5,950	1,179	3,530	1,980
Colorado	24,000	18,300	25,000	16,700	2,712	7,449	4,260
New Mexico	8,000	5,380	8,000	4,820	1,005	2,451	1,480
Arizona	4,500	2,320	3,700	1,600	427	841	600
Utah	11,700	12,800	12,000	10,700	2,257	5,292	4,200
Nevada	2,300	1,800	2,300	1,720	384	1,286	540
MOUNTAIN STATES	**111,000**	**96,800**	**95,000**	**76,090**	**14,536**	**37,644**	**23,190**
Washington	27,000	24,550	16,000	15,400	4,218	8,536	6,670
Oregon	23,000	22,950	15,000	13,600	3,634	7,487	6,300
California	33,000	27,500	22,000	16,000	3,590	8,129	4,890
PACIFIC	**83,000**	**75,000**	**53,000**	**45,000**	**11,442**	**24,152**	**17,860**
TOTAL	**1,615,000**	**1,663,000**	**1,400,000**	**1,188,000**	**376,440**	**579,943**	**641,000**

[1] Does not include windrowers with conditioning rolls.

Principal Machines on Farms – 1983

STATE	POWER ELEVATORS Estimated July 1, 1951 Number	POWER ELEVATORS Estimated July 1, 1958 Number	POWER ELEVATORS Estimated July 1, 1983 Number	Manure Spreaders Estimated July 1, 1983 Number	Corn and Cotton Planters Estimated July 1, 1983 Number	Grain Drills Estimated July 1, 1983 Number
Maine	1,200	12,000	5,400	3,420	350	930
New Hampshire			2,560	2,150	310	65
Vermont			8,200	6,840	1,730	350
Massachusetts			3,680	2,500	950	120
Rhode Island			520	300	110	35
Connecticut			4,290	2,600	1,110	90
New York	7,200	35,000	71,500	43,600	21,400	29,100
New Jersey	2,000	5,500	6,280	2,610	2,600	2,650
Pennsylvania	9,600	38,000	76,100	45,200	36,300	43,800
Delaware	500	2,000	4,020	1,900	2,300	2,200
Maryland	2,500	7,500	16,750	9,100	9,350	9,720
NORTHEAST	**23,000**	**100,000**	**199,300**	**120,220**	**76,510**	**89,080**
Ohio	27,000	68,000	130,600	61,000	69,500	69,500
Indiana	30,000	66,000	129,700	54,000	71,200	56,400
Illinois	61,000	110,000	197,900	79,000	103,800	71,000
Iowa	80,000	122,000	207,800	108,000	115,500	66,200
Missouri	15,000	41,000	92,500	60,500	55,000	57,300
CORN BELT	**213,000**	**407,000**	**758,500**	**362,500**	**415,000**	**320,400**
Michigan	14,000	45,000	92,700	39,900	42,000	56,000
Wisconsin	15,000	48,000	146,000	91,300	74,000	71,000
Minnesota	46,000	90,000	163,500	83,000	89,000	82,200
LAKE STATES	**75,000**	**183,000**	**402,200**	**214,200**	**205,000**	**209,200**
North Dakota	28,000	45,000	79,300	22,500	16,700	65,300
South Dakota	24,000	40,000	70,500	31,300	33,600	36,900
Nebraska	36,000	60,000	109,200	48,000	50,000	47,400
Kansas	25,000	55,000	116,500	40,300	24,500	77,200
GREAT PLAINS	**113,000**	**200,000**	**375,500**	**142,100**	**124,800**	**226,800**
West Virginia	500	3,000	7,000	9,100	5,770	4,050
Kentucky	2,500	10,000	27,100	30,000	42,600	12,450
Tennessee	1,000	6,500	16,700	22,000	57,500	15,600
Virginia	2,000	11,000	21,000	23,500	29,000	18,900
North Carolina	1,000	7,500	22,650	22,800	80,900	25,400
APPALACHIAN	**7,000**	**38,000**	**94,450**	**107,400**	**215,770**	**76,400**
South Carolina	300	2,000	5,150	4,250	34,200	13,100
Georgia	900	6,000	15,350	7,200	43,000	11,250
Florida	300	1,500	4,070	1,300	6,600	1,950
Alabama	500	4,500	12,620	4,800	47,000	7,900
SOUTHEAST	**2,000**	**14,000**	**37,190**	**17,550**	**130,800**	**34,200**
Mississippi	700	4,500	8,620	5,480	58,500	9,300
Louisiana	400	1,000	2,820	3,150	21,950	8,300
Arkansas	900	4,500	10,520	7,700	24,100	15,000
DELTA STATES	**2,000**	**10,000**	**21,960**	**16,330**	**104,550**	**32,600**
Oklahoma	6,000	12,000	28,050	10,000	10,300	36,200
Texas	9,000	23,000	44,650	18,900	61,800	56,500
SOUTHERN PLAINS	**15,000**	**35,000**	**72,700**	**28,900**	**72,100**	**92,700**
Montana	7,500	17,500	31,200	11,800	1,220	24,420
Idaho	3,100	13,300	27,250	14,700	2,950	17,800
Wyoming	700	2,500	5,600	5,050	1,070	4,750
Colorado	7,000	13,000	28,100	15,000	6,950	17,800
New Mexico	500	1,500	2,870	2,450	3,530	2,250
Arizona	100	700	2,010	1,050	2,150	1,650
Utah	700	5,000	11,220	8,150	1,900	6,300
Nevada	400	500	1,050	1,200	70	370
MOUNTAIN STATES	**20,000**	**54,000**	**109,300**	**59,400**	**19,840**	**75,340**
Washington	2,000	8,000	24,250	15,600	2,050	14,400
Oregon	3,000	8,000	19,550	13,700	1,280	13,500
California	4,000	13,000	26,100	16,100	10,300	10,400
PACIFIC	**9,000**	**29,000**	**69,900**	**45,400**	**13,630**	**38,300**
TOTAL	**479,000**	**1,070,000**	**2,141,000**	**1,114,000**	**1,378,000**	**1,195,000**

Principal Machines on Farms—1983

STATE	MOTOR TRUCKS 1954 Adj. Cen. 1,000's[1]	1959 Census 1,000's	1964 Census 1,000's	1969 Census 1,000's	1974 Census 1,000's	1978 Census 1,000's	Estimated July 1, 1983 1,000's	Internal Combustion Engines[2] Estimated July 1, 1983 Number	Chain Saws Estimated July 1, 1983 Number
Maine	18.1	17.3	14.8	12.1	11.3	13.5	13.5	1,760	8,650
New Hampshire	8.3	6.8	5.6	4.0	3.7	4.4	4.4	1,650	2,875
Vermont	11.1	10.0	8.1	6.1	6.2	7.9	8.0	2,300	7,150
Massachusetts	14.3	12.3	10.6	8.4	7.7	9.9	10.1	2,370	5,230
Rhode Island	1.9	1.9	1.8	1.2	1.2	1.5	1.5	240	730
Connecticut	13.2	11.0	9.9	7.4	6.2	7.5	7.5	2,100	4,395
New York	70.5	66.5	62.9	53.6	53.6	61.2	62.1	27,400	57,500
New Jersey	24,4	20.9	17.3	14.3	12.9	16.5	16.8	3,050	6,900
Pennsylvania	71.0	71.4	69.5	57.3	55.5	66.3	67.0	27,000	50,400
Delaware	5.2	5.3	5.2	5.1	5.7	6.5	6.6	1,230	2,900
Maryland	22.0	21.2	21.3	19.5	21.3	25.5	26.0	6,000	14,140
NORTHEAST	**260.0**	**244.6**	**227.0**	**189.0**	**185.3**	**220.7**	**223.5**	**75,100**	**180,870**
Ohio	77.0	81.5	91.4	93.7	97.8	112.9	114.7	25,700	70,000
Indiana	77.4	88.2	99.0	100.1	103.9	120.2	122.0	26,400	75,500
Illinois	99.9	113.7	120.9	129.3	139.9	155.4	158.0	39,200	81,800
Iowa	84.3	99.8	106.7	121.4	137.1	148.0	150.5	41,500	65,000
Missouri	95.8	109.7	123.0	132.5	134.0	162.5	165.3	42,600	108,800
CORN BELT	**434.4**	**492.9**	**541.0**	**577.0**	**612.7**	**699.0**	**710.5**	**175,400**	**401,100**
Michigan	70.5	75.7	80.5	74.6	73.6	83.4	84.7	23,500	52,500
Wisconsin	87.0	90.6	97.0	89.0	92.3	100.9	102.6	45,000	106,600
Minnesota	90.0	103.4	112.5	116.9	130.1	147.4	150.0	61,000	76,200
LAKE STATES	**247.5**	**269.7**	**290.0**	**280.5**	**296.0**	**331.7**	**337.3**	**129,500**	**235,300**
North Dakota	66.8	75.5	81.6	91.2	101.3	109.2	110.8	45,400	4,950
South Dakota	47.7	52.3	56.5	57.8	65.1	66.9	68.1	30,500	3,800
Nebraska	72.0	83.4	93.1	96.4	108.5	120.5	122.3	41,500	16,150
Kansas	112.1	122.3	134.0	141.3	150.9	164.4	167.3	53,800	26,700
GREAT PLAINS	**298.6**	**333.5**	**365.2**	**386.7**	**425.8**	**461.0**	**468.5**	**171,200**	**51,600**
West Virginia	26.0	24.7	24.1	19.5	16.9	21.8	22.0	6,400	24,900
Kentucky	66.7	74.9	90.5	97.1	95.8	125.4	127.4	21,000	51,400
Tennessee	71.6	76.8	86.3	92.8	88.1	104.6	106.2	16,000	67,900
Virginia	57.5	58.0	59.2	55.9	55.5	70.1	71.0	15,500	56,250
North Carolina	84.5	91.1	101.1	99.3	93.5	113.5	115.3	20,200	100,600
APPALACHIAN	**306.3**	**325.5**	**361.2**	**364.6**	**349.8**	**435.4**	**441.9**	**79,100**	**301,050**
South Carolina	39.2	39.1	39.0	35.3	33.7	40.5	40.9	8,000	28,450
Georgia	76.2	72.8	76.6	70.9	69.2	79.8	81.1	16,500	39,200
Florida	36.6	36.4	40.6	37.8	40.1	54.1	54.8	16,000	8,950
Alabama	63.7	63.4	69.5	67.4	64.4	75.1	76.2	13,500	36,900
SOUTHEAST	**215.7**	**211.7**	**225.7**	**211.4**	**207.4**	**249.5**	**253.0**	**54,000**	**113,500**
Mississippi	76.2	71.5	75.1	66.4	60.5	65.5	66.2	13,000	43,600
Louisiana	47.3	47.2	51.3	44.7	41.6	50.4	51.0	15,500	23,900
Arkansas	76.2	73.2	80.6	71.4	69.5	88.0	89.0	17,500	36,600
DELTA STATES	**199.7**	**191.9**	**207.0**	**182.5**	**171.6**	**203.9**	**206.2**	**46,000**	**104,100**
Oklahoma	85.7	92.7	105.1	106.8	101.6	126.2	127.7	26,500	11,820
Texas	187.8	197.8	211.0	227.6	208.1	257.3	257.5	79,000	23,100
SOUTHERN PLAINS	**273.5**	**290.5**	**316.1**	**334.4**	**309.7**	**383.5**	**385.2**	**105,500**	**34,920**
Montana	48.5	52.8	58.2	58.3	61.9	68.9	70.2	23,800	14,120
Idaho	38.7	44.0	48.3	47.1	51.4	59.2	60.2	19,600	15,650
Wyoming	15.0	16.2	17.7	18.4	19.2	20.6	21.1	7,800	3,810
Colorado	48.5	51.7	55.9	55.5	56.9	66.4	67.6	25,000	7,200
New Mexico	21.3	20.3	23.4	18.8	20.0	26.4	27.0	9,400	3,600
Arizona	13.5	16.8	17.2	12.1	14.4	16.8	17.2	6,350	610
Utah	18.0	18.8	20.3	18.3	19.4	22.7	23.2	8,150	2,850
Nevada	3.9	4.5	4.5	5.0	5.4	6.5	6.6	1,900	720
MOUNTAIN STATES	**207.4**	**225.1**	**245.5**	**233.5**	**248.6**	**287.5**	**293.1**	**102,000**	**48,560**
Washington	55.4	60.2	64.2	56.7	57.1	71.4	72.9	20,500	27,150
Oregon	47.7	48.9	53.6	46.2	49.6	60.8	61.9	26,500	30,750
California	128.8	131.0	126.1	115.7	118.8	142.7	145.0	79,200	38,100
PACIFIC	**231.9**	**240.1**	**243.9**	**218.6**	**225.5**	**274.9**	**279.8**	**128,200**	**96,000**
TOTAL	**2,675.0**	**2,825.5**	**3,022.6**	**2,978.2**	**3,032.4**	**3,547.1**	**3,599.0**	**1,064,000**	**1,547,000**

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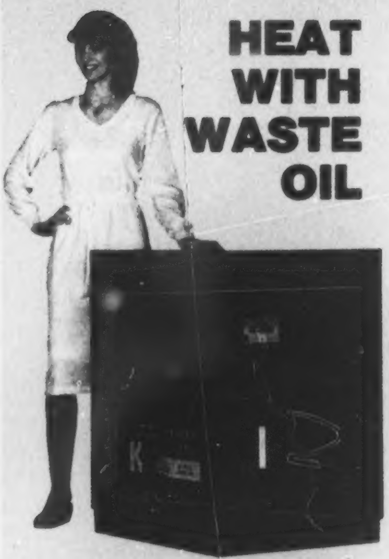
[1] Census numbers have been adjusted to bring them more in line with 1959 and later data based on the new definition of a farm.

[2] Includes engines used for stationary work such as irrigation, auxiliary engines on combines, balers, etc., and a small number of power units not elsewhere classified.



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	Two-Wheel-Drive Tractors						
State	40-49	50-59	60-69	70-79	80-89	90-99	100-119
Alabama	366	184	124	94	101	21	56
Alaska	3	1	3	.....	.....	1	1
Arizona	41	12	51	28	75	25	48
Arkansas	499	206	185	77	67	18	62
California	378	403	651	390	471	75	179
Colorado	46	59	57	22	46	20	53
Connecticut	38	25	25	12	24	7	6
Delaware	8	13	10	8	9	1	13
Florida	319	230	288	332	201	15	100
Georgia	549	240	231	152	164	27	82
Hawaii	9	12	2	5	2	.....	4
Idaho	48	63	79	32	85	38	106
Illinois	161	186	252	191	259	74	308
Indiana	137	140	168	96	211	29	140
Iowa	65	108	221	171	387	131	603
Kansas	64	63	89	59	138	87	302
Kentucky	826	520	403	235	263	60	108
Louisiana	488	171	187	213	67	22	55
Maine	54	58	41	12	28	4	29
Maryland	106	91	57	41	73	12	50
Massachusetts	35	43	19	20	15	3	6
Michigan	161	191	237	139	218	66	164
Minnesota	61	123	222	147	367	150	444
Mississippi	397	166	191	165	91	17	71
Missouri	334	239	346	136	274	79	227
Montana	109	49	87	40	93	28	91
Nebraska	25	38	43	36	150	86	352
Nevada	9	13	18	2	4	5	4
New Hampshire	44	48	26	12	16	4	5
New Jersey	95	51	25	18	20	6	9
New Mexico	48	33	22	45	5	11	18
New York	163	257	267	182	397	83	178
North Carolina	598	322	231	121	284	42	121
North Dakota	9	25	30	19	66	33	199
Ohio	237	233	269	169	227	61	181
Oklahoma	334	172	171	96	134	84	234
Oregon	213	182	123	43	84	28	61
Pennsylvania	246	250	310	122	259	79	134
Rhode Island	6	1	2	2	1	.....	.....
South Carolina	222	108	92	64	91	9	30
South Dakota	10	22	27	25	159	90	268
Tennessee	609	355	253	102	170	38	83
Texas	1,690	672	959	584	482	179	363
Utah	48	87	70	40	46	22	50
Vermont	31	50	54	19	46	6	16
Virginia	437	250	214	115	214	22	78
Washington	368	322	160	72	73	18	36
West Virginia	120	71	75	20	22	4	9
Wisconsin	88	203	369	282	568	158	412
Wyoming	17	16	22	11	38	20	34
U.S. Government	2	.....	2	92	.....	.....	2
Miscellaneous	39	28	27	122	16	.....	.....
TOTAL	**11,011**	**7,405**	**8,087**	**5,232**	**7,301**	**2,098**	**6,185**

1982 Retail Sales of Farm Wheel Tractors by PTO Horsepower (in units)

						Four-Wheel Drive Tractors					
120-129	130-139	140-149	150-179	180 & over	Total 2-Wheel Drive	Under 200	200-249	250 & over	Total 4-Wheel Drive	All Farm Wheel Tractors	State
5	79	11	47	20	1,108	8	5	1	14	1,122	Alabama
.....	.....	.....	1	.....	10	.....	.....	.....	.....	10	Alaska
5	46	1	29	64	425	36	11	26	73	498	Arizona
13	144	49	194	258	1,772	26	59	40	125	1,897	Arkansas
38	169	14	125	83	2,976	67	84	100	251	3,227	California
22	160	16	70	63	634	37	39	45	121	755	Colorado
.....	7	.....	1	.....	145	2	.....	.....	2	147	Connecticut
5	5	.....	2	5	79	4	1	.....	5	84	Delaware
15	79	23	25	9	1,636	39	12	4	55	1,691	Florida
31	169	25	83	68	1,821	9	9	9	27	1,848	Georgia
.....	2	.....	.....	1	37	.....	.....	2	2	39	Hawaii
55	149	18	118	21	812	67	87	43	197	1,009	Idaho
145	868	90	697	349	3,580	267	187	146	600	4,180	Illinois
88	367	44	265	122	1,807	126	100	63	289	2,096	Indiana
210	1,453	174	579	217	4,319	255	147	73	475	4,794	Iowa
107	658	68	448	270	2,353	222	202	91	515	2,868	Kansas
19	80	6	47	42	2,609	8	10	5	23	2,632	Kentucky
10	121	22	123	128	1,607	17	20	29	66	1,673	Louisiana
1	14	.....	1	.....	242	3	.....	.....	3	245	Maine
12	32	5	8	5	492	6	5	3	14	506	Maryland
.....	1	1	1	.....	144	1	.....	.....	1	145	Massachusetts
36	228	27	108	38	1,613	125	52	20	197	1,810	Michigan
99	731	84	289	76	2,793	235	144	100	479	3,272	Minnesota
4	110	18	193	140	1,563	34	18	19	71	1,634	Mississippi
88	400	52	216	140	2,531	100	60	49	209	2,740	Missouri
46	110	9	61	31	754	106	109	109	324	1,078	Montana
95	798	78	421	215	2,337	115	72	39	226	2,563	Nebraska
1	4	1	3	2	66	4	1	.....	5	71	Nevada
.....	2	.....	1	.....	158	.....	.....	.....	.....	158	New Hampshire
4	11	.....	8	2	249	1	.....	.....	1	250	New Jersey
8	47	2	33	14	286	1	10	3	14	300	New Mexico
30	129	11	32	12	1,741	45	23	9	77	1,818	New York
20	121	29	67	66	2,022	19	10	5	34	2,056	North Carolina
91	453	31	271	95	1,322	302	238	200	740	2,062	North Dakota
71	280	41	145	59	1,973	88	53	23	164	2,137	Ohio
53	361	21	159	72	1,891	127	104	48	279	2,170	Oklahoma
11	72	5	39	7	868	42	23	19	84	952	Oregon
35	112	4	18	6	1,575	16	9	1	26	1,601	Pennsylvania
.....	.....	.....	.....	.....	12	.....	.....	.....	.....	12	Rhode Island
7	74	13	31	38	779	6	7	4	17	796	South Carolina
87	423	21	181	42	1,355	106	80	52	238	1,593	South Dakota
18	132	11	95	57	1,923	9	11	9	29	1,952	Tennessee
109	807	108	513	420	6,886	115	98	86	299	7,185	Texas
14	56	5	22	6	466	10	5	8	23	489	Utah
5	9	4	3	2	245	8	.....	.....	8	253	Vermont
11	68	6	21	19	1,455	12	2	1	15	1,470	Virginia
11	58	7	30	13	1,168	49	61	24	134	1,302	Washington
.....	3	1	.....	.....	325	1	.....	.....	1	326	West Virginia
128	422	39	146	45	2,880	117	35	15	167	3,027	Wisconsin
7	31	4	19	5	224	28	11	5	44	268	Wyoming
.....	.....	.....	.....	.....	98	.....	.....	.....	.....	98	U.S. Government
.....	1	.....	1	.....	234	.....	.....	.....	.....	234	Miscellaneous
1,870	**10,656**	**1,199**	**5,990**	**3,347**	**70,381**	**3,021**	**2,214**	**1,528**	**6,763**	**77,144**	**TOTAL**

DATA: Farm & Industrial Equipment Institute. Figures do not include garden tractors, motor tillers, or contractor's off-highway types. Report includes units marketed by these firms: Allied Farm Equip. (Leyland, Satoh); Allis-Chalmers; Belarus; J I Case; Deere; Deutz; Ford; International Harvester; Long; Massey-Ferguson; Steiger; Versatile; R.M. Wade (Satoh); and White. Sales reported as miscellaneous are retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels such as gifts to non-profit organizations, intra-plant or company transfers, etc.

RETAIL SALES OF SELECTED FARM EQUIPMENT — Jan.-Dec. 1982(1)

(In Units)

	Combines S-P	Corn Heads	Hay Balers(2)	— Windrowers Self-Propelled — Power Units	Total Heads	Grinder-Mixers	Shear-Bar Forage Harvesters(3)	Mower Conditioners, All Types	Manure Spreaders Conveyor-Type
Alabama	113	29	105	1	1	74	35	112	4
Alaska	.....	.....	12	.....	.....	1	1	6	.....
Arizona	31	5	26	34	47	8	9	9	2
Arkansas	308	7	102	.....	.....	46	7	239	56
California	183	49	141	172	191	7	54	35	59
Colorado	228	114	332	159	170	34	61	106	41
Connecticut	1	.....	39	.....	.....	1	34	73	65
Delaware	15	10	11	.....	.....	7	2	7	24
Florida	40	17	64	2	2	13	26	65	21
Georgia	383	122	146	1	2	129	53	157	25
Hawaii	.....	.....	.....	.....	.....	.....	.....	1	.....
Idaho	29[illegible]	9	367	209	215	26	26	109	95
Illinois	1,714	1,790	199	7	8	312	140	464	455
Indiana	721	775	186	4	5	205	88	329	320
Iowa	1,895	1,904	231	82	102	749	278	689	1,260
Kansas	1,377	141	218	140	158	160	126	485	156
Kentucky	178	117	186	4	6	177	105	619	213
Louisiana	128	6	66	.....	.....	12	13	50	17
Maine	4	5	46	2	2	3	30	70	74
Maryland	75	85	73	9	10	34	53	97	144
Massachusetts	.....	1	35	.....	.....	3	33	56	45
Michigan	263	273	230	29	28	151	208	384	477
Minnesota	1,013	734	447	349	383	392	458	745	1,186
Mississippi	236	8	73	1	1	39	36	60	20
Missouri	732	255	246	16	20	304	77	901	232
Montana	397	3	205	303	369	49	34	148	39
Nebraska	1,143	809	143	179	213	346	239	412	281
Nevada	2	.....	29	46	50	1	5	9	9
New Hampshire	.....	1	25	.....	.....	.....	17	62	41
New Jersey	6	10	32	2	2	9	10	36	43
New Mexico	33	3	121	39	39	5	16	26	2
New York	90	97	519	37	38	84	440	727	1,224
North Carolina	295	254	189	.....	.....	93	71	261	105
North Dakota	910	73	32	472	549	91	81	186	81
Ohio	382	405	301	9	9	220	154	547	548
Oklahoma	559	13	216	78	92	72	22	415	36
Oregon	130	16	209	127	145	10	21	115	74
Pennsylvania	108	131	548	35	37	242	351	775	965
Rhode Island	.....	.....	2	.....	.....	.....	.....	5	2
South Carolina	133	55	51	.....	.....	54	21	107	24
South Dakota	450	222	69	395	432	196	230	171	175
Tennessee	165	45	216	.....	.....	167	97	556	100
Texas	759	145	478	61	69	161	39	943	118
Utah	27	5	258	76	84	16	45	148	68
Vermont	3	3	69	4	4	.....	81	129	175
Virginia	112	95	198	4	5	82	119	517	180
Washington	207	22	218	76	89	10	55	112	69
West Virginia	5	3	95	1	1	21	24	129	44
Wisconsin	313	413	966	204	215	344	997	[illegible]	1,78[illegible]
Wyoming	46	15	135	104	128	14	23	52	2[illegible]
U.S. Government	.....	.....	.....	.....	.....	.....	.....	.....	.....
Miscellaneous (4)	1	.....	.....	1	1	.....	.....	2	.....
TOTAL	**18,205**	**9,294**	**8,905**	**3,474**	**3,922**	**5,176**	**5,145**	**13,981**	**11,201**

Data released Feb. 25, 1983, Farm & Industrial Equipment Institute.

(1) Includes revisions for prior months.
(2) For making bales of under 200 lbs
(3) Pull-type, mounted, self-propelled
(4) Sales reported as miscellaneous are retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels such as gifts to non-profit organizations, intra-plant or company transfers, etc.

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NEW AGRICULTURAL WHEEL TRACTOR IMPORTS—JAN. 1981—JUNE 1983

Number of Units

(Excludes garden tractors except as indicated in headings, footnotes.)

Nation of Origin	Under 40 HP*	40-79 HP*	80-99 HP*	100 HP and Over*	HP Not Specifically Provided*	Not Elsewhere Specified, Excl. Industrial, Incl. Garden Types**	TOTALS
Canada							
6 mos., 1983	36	22	25	240	531	61	915
year 1982	32	63	84	347	1,383	233	2,142
year 1981	73	47	121	461	1,915	153	2,770
United Kingdom							
6 mos., 1983	3,148	6,597	849	129	5	82	10,805
year 1982	546	3,195	754	156	74	284	5,009
year 1981	614	6,031	1,109	382	15	93	8,544
Japan							
6 mos., 1983	21,211	1,436	21	22	306	4,671	27,667
year 1982	37,534	3,063	13	231	774	8,101	49,716
year 1981	40,978	2,821	3	85	714	5,469	49,530
West Germany							
6 mos., 1983	32	5,187	1,255	191	5	1	6,669
year 1982	2	4,016	2,718	668	43	32	7,479
year 1981	2	6,653	2,421	750	7	8	9,841
Italy							
6 mos., 1983	98	689	175	119	1	1,310	2,392
year 1982	417	1,399	369	863	2	67	3,117
year 1981	767	1,839	430	341	57	116	3,559
Romania							
6 mos., 1983	123	374	.....	.....	.....	17	514
year 1982	1,101	3,317	1	1	12	14	4,446
year 1981	558	3,050	.....	1	.....	2	3,611
France							
6 mos., 1983	20	496	94	.....	.....	1	611
year 1982	.....	19	245	11	34	.....	309
year 1981	1	48	.....	17	.....	2	68
TOTALS							
6 mos., 1983	24,724	15,777	2,417	707	857	6,193	50,675
year 1982	39,764	15,858	4,190	2,378	2,366	8,739	73,295
year 1981	44,208	21,012	4,084	2,339	2,714	5,858	80,215

Source: U.S. Dept. of Commerce, Bureau of Industrial Economics, Office of Producer Goods.

*Excluding garden tractors. **Including garden tractors.

Other imports: 1981—Argentina (1,071), Belgium (639), Brazil (60), Czechoslovakia (40), Korea (61), Netherlands (28), Poland (24), U.S.S.R. (332).
1982—Belgium (90), Brazil (22), P. R. China (106), Czechoslovakia (131), Mexico (606) U.S.S.R. (4).
1983 (6 mos.)—Czechoslovakia (53), Ireland (23), Mexico (819), U.S.S.R. (131).

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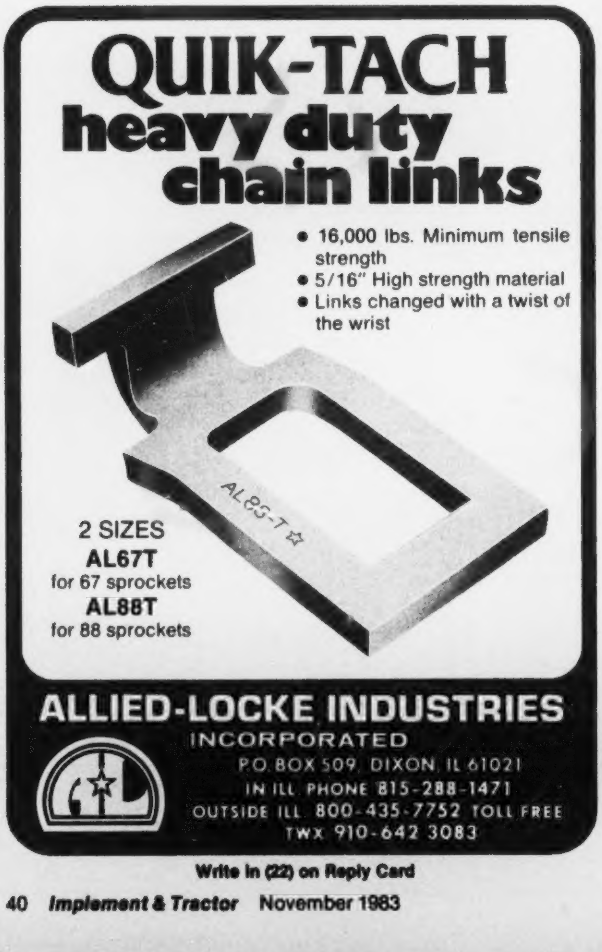
DOLLAR VALUE OF FARM EQUIPMENT IMPORTS BY COUNTRY OF ORIGIN, Jan., 1978-June, 1983

(In thousands)

Country	Jan.-Dec. 1978	Jan.-Dec. 1979	Jan.-Dec. 1980	Jan.-Dec. 1981	Jan.-Dec. 1982	Jan.-June 1983
Canada	$506,728	$831,155	$820,500	$706,276	$487,286	$212,121
Mexico	6,277	10,082	9,080	9,699	11,349	9,480
Brazil	2,194	892	1,002	1,064	4,780	2,638
Sweden	1,708	4,818	4,456	2,784	3,023	1,115
Denmark	4,513	7,158	5,703	4,690	4,910	3,602
Netherlands	12,690	16,942	15,407	13,626	13,924	12,624
United Kingdom	125,241	209,967	215,932	153,589	93,806	81,056
Belgium	66,347	93,709	67,188	50,393	25,730	13,176
France	36,351	62,294	51,488	41,695	30,804	24,134
West Germany	141,392	231,521	236,578	197,110	169,087	127,252
Hungary	4,673	10,727	10,155	9,329	7,564	546
U.S.S.R.	1,113	2,715	1,716	1,296	128	435
Romania	8,372	11,648	11,611	12,598	15,461	2,438
Italy	75,066	78,523	94,794	100,853	95,092	43,959
Spain	3,768	9,239	5,559	3,561	6,541	1,189
Israel	1,545	2,616	3,218	2,777	2,677	2,152
New Zealand	1,918	5,312	6,665	8,630	9,792	6,907
Australia	3,218	5,937	4,366	7,306	4,662	1,783
Japan	167,858	267,599	189,753	202,000	181,056	94,913
China (Taiwan)	1,446	1,916	1,573	2,562	2,913	1,953
China (P.R.C.)	NA	30	100	86	1,381	1,147
South Africa	3,972	6,332	5,234	2,409	228	63
TOTAL	**$1,182,758**	**$1,880,470**	**$1,773,033**	**$1,549,799**	**$1,179,734**	**$649,594**

Source: U.S. Dept. of Commerce, Bureau of Industrial Economics, Office of Producer Goods.
NA: Data not available.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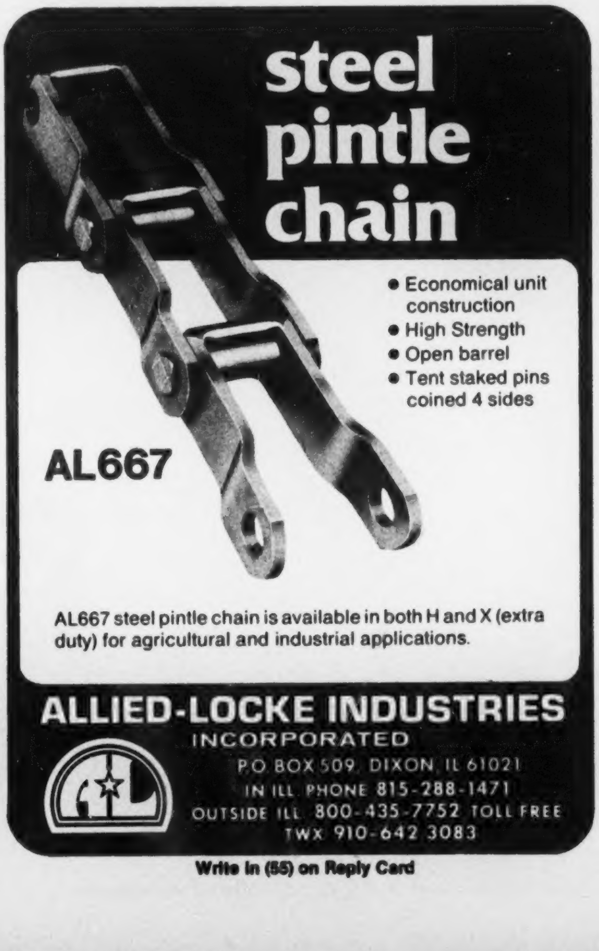
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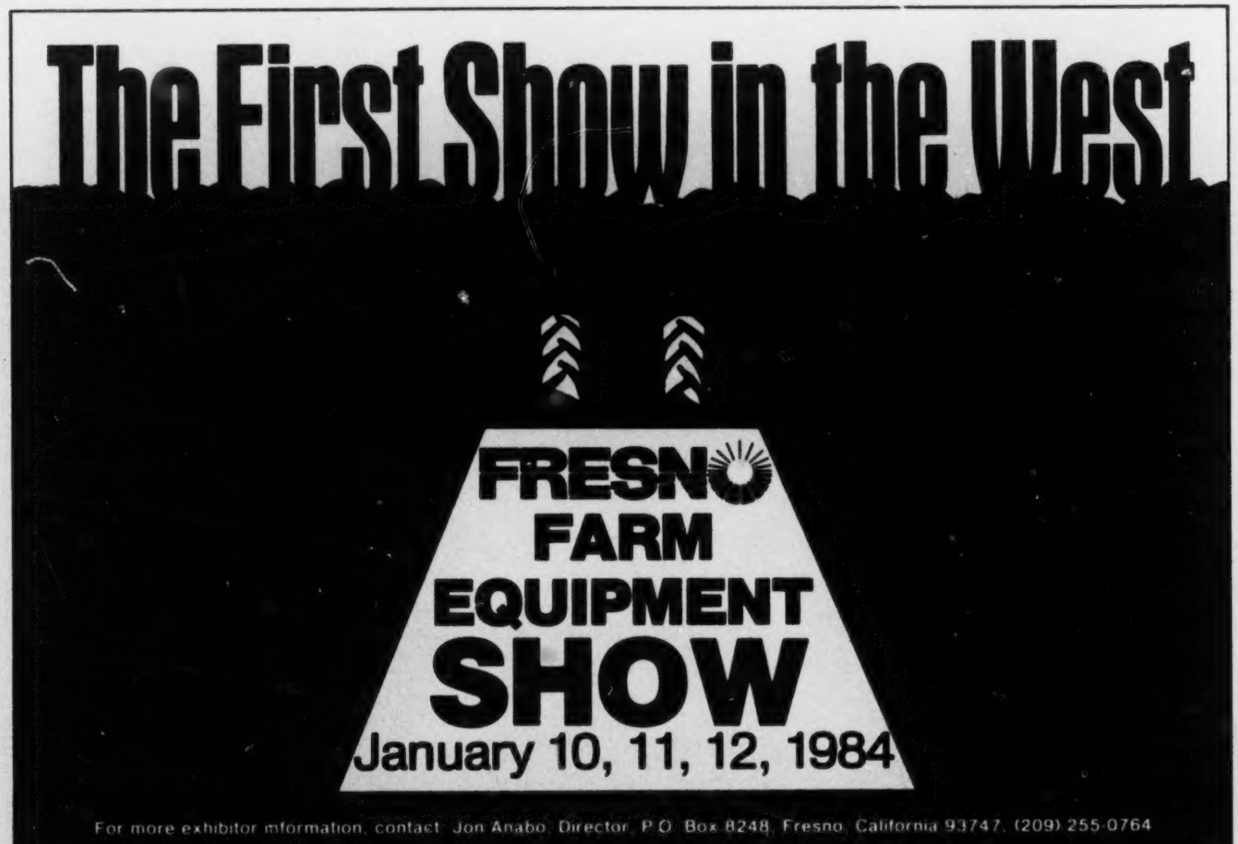
IMPORTS OF FARM EQUIPMENT BY PRODUCT

Product	Jan.-Dec., 1981		Jan.-Dec., 1982		Jan.-June, 1983	
	Quantity	Value in Thousands of Dollars	Quantity	Value in Thousands of Dollars	Quantity	Value in Thousands of Dollars
Knives & Cutting Blades	7,184,967	$ 10,022	7,524,683	$10,620	4,227,106	$ 4,683
Plows & Listers	5,385	9,361	5,204	4,496	1,594	1,833
Cultivators & Weeders	10,190	25,274	14,342	17,862	11,116	12,316
Parts of Plows, Cultivators, Weeders & Listers	.....	28,114	.....	21,074	.....	12,737
Harrows, Rollers, Stalk Cutters, Soil Pulverizers	21,615	10,794	21,297	7,584	17,347	2,968
Parts of Harrows, Rollers, Stalk Cutters, etc.	.....	11,965	.....	12,789	.....	7,485
Planting, Seeding & Fertilizing Machinery	31,764	54,212	30,217	38,360	15,852	16,800
Parts of Planting, Seeding & Fertilizing Machinery	.....	12,642	.....	8,987	.....	5,523
Haying Machinery other than Mowers	5,847	13,061	7,483	11,207	5,322	7,951
Mowers except Lawn Mowers	14,895	24,523	14,370	25,089	6,283	11,896
Harvesting Machines, NES	14,647	196,569	9,141	110,813	4,876	41,767
Parts of Harvesting Machines	.....	65,224	.....	58,099	.....	21,983
Farm Wagons & Carts	9,963	13,010	4,767	7,684	2,218	3,447
Agricultural Machines & Implements, NES	.....	94,045	.....	73,701	.....	47,866
Parts of Agricultural Machines, NES	.....	67,308	.....	53,662	.....	30,527
Tractors, Agricultural, Wheel-Type, New, excluding Industrial*	80,215	590,549	73,295	505,373	50,675	312,723
Tractors, Agri., Used	3,176	20,551	3,349	23,311	1,629	12,779
Parts for Agri. Tractors	.....	296,988	.....	183,024	.....	89,869

Source: U.S. Dept. of Commerce, Bureau of Industrial Economics, Office of Producer Goods.

NES – Not elsewhere specified.

*Use of the term "Industrial" here is understood to refer to such machines as forklifts but not to industrial tractors as commonly defined in the farm and industrial equipment industry.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FARM EQUIPMENT EXPORTS BY TYPE OF PRODUCT

Product	Jan.-Dec., 1981		Jan.-Dec., 1982		Jan.-June, 1983	
	Quantity	Dollar Value in Thousands	Quantity	Dollar Value in Thousands	Quantity	Dollar Value in Thousands
Combines, pull-type	2,061	43,402	1,895	45,765	699	18,499
Combines, self-propelled	6,936	252,609	5,861	225,909	1,442	60,141
Cultivators, tractor-drawn or mounted	8,780	15,490	4,522	9,213	1,947	3,038
Cultivators, NEC, and Weeders	3,277	5,467	2,745	4,638	1,537	1,945
Farm Elevators and Blowers	3,323	12,295	1,812	5,851	906	2,468
Farm Wagons and Carts	3,208	6,001	1,804	3,100	888	1,112
Parts for Farm Wagons and Carts	.....	2,014	.....	1,155	.....	1,147
Fertilizing Machines	8,096	20,814	4,528	14,319	2,787	7,873
Forage Harvesters	3,806	30,155	2,234	30,420	1,516	21,488
Harrows, Disk	9,851	26,568	4,357	18,713	3,618	9,531
Harrows, NEC, & Soil Pulverizers	9,043	10,557	5,908	7,922	4,305	4,300
Parts for Harrows, Stalk Cutters & Soil Pulverizers	.....	9,875	.....	8,307	.....	2,249
Harvesting Machines, NEC	10,474	110,879	7,390	63,524	3,059	17,907
Harvesting Machine Parts	.....	151,325	.....	93,927	.....	41,600
Hay Balers	14,654	85,244	7,113	45,785	3,140	21,544
Haying Machines, NEC (incl. rakes & tedders)	9,087	44,660	5,063	29,162	2,417	8,878
Parts for Haying Machines	.....	24,837	.....	26,805	.....	13,075
Mowers, Cutterbar, tractor-drawn	3,232	7,838	2,065	5,903	499	1,446
Mowers, Rotary, tractor-drawn (excl. lawn mowers)	8,826	6,861	9,351	7,192	3,409	2,865
Mowers, NEC, tractor-drawn (excl. lawn mowers)	3,598	11,128	1,641	4,899	964	2,685
Planting Machines	9,028	22,606	4,944	11,507	1,880	3,277
Plows, Disk	3,960	9,384	2,132	5,202	295	737
Plows, Moldboard	6,140	17,577	2,709	8,570	984	3,196
Plows & Listers, NEC	5,259	15,160	6,190	17,007	2,883	5,744
Parts for Plows, Listers, Cultivators & Weeders	.....	35,876	.....	24,455	.....	9,896
Seeding Machines	16,604	30,111	12,163	23,236	6,343	12,168
Parts for Planting, Seeding & Fertilizing Machines	.....	19,939	.....	14,943	.....	8,225
Farm Tractors:						
Under 40 PTO HP	2,089	13,822	1,133	5,925	370	1,883
40-59 PTO HP	1,784	21,320	646	7,644	198	1,908
60-79 PTO HP	1,376	20,650	1,066	17,599	228	3,316
80-99 PTO HP	1,984	37,231	858	19,883	314	8,274
100-119 PTO HP	4,355	105,804	2,250	63,492	612	19,590
120-139 PTO HP	7,057	188,020	4,191	124,063	1,060	36,461
140-159 PTO HP	2,449	75,793	1,877	61,223	645	23,348
160-179 PTO HP	1,914	74,216	1,400	64,045	533	24,461
180 HP & Over	3,741	179,283	3,253	182,641	897	51,883
Other Farm Tractors	2,817	54,716	1,216	18,103	1,154	6,114
Parts for Farm Tractors	.....	778,425	.....	658,608	.....	274,986

Source: U.S. Dept. of Commerce, Bureau of Industrial Economics, Office of Producer Goods.
NEC—Not elsewhere counted or classified.

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VALUE OF U.S. FARM EQUIPMENT EXPORTS BY COUNTRIES OF DESTINATION

(Value in thousands of dollars)

Country	1981	1982	Jan.-June 1983
Western Hemisphere			
Canada	$1,377,947	$997,453	$426,397
Mexico	259,970	124,601	15,823
Guatemala	6,498	3,792	1,170
Honduras	5,822	2,825	1,449
Nicaragua	10,014	5,704	2,354
Costa Rica	3,375	1,772	1,275
Panama	7,906	13,032	1,928
Trinidad	5,362	6,110	2,658
Dominican Republic	7,540	3,836	2,531
Colombia	18,755	18,238	8,100
Jamaica	3,703	5,600	1,516
Venezuela	76,691	72,641	9,220
Brazil	30,805	19,522	4,592
Uruguay	3,200	1,130	453
Paraguay	3,344	1,725	221
Argentina	27,807	10,496	3,817
Chile	11,893	3,163	1,342
Ecuador	16,163	14,325	3,610
Peru	11,686	8,811	3,032
Europe			
Denmark	5,729	3,673	1,042
Sweden	10,028	8,046	4,263
United Kingdom	77,137	72,031	35,269
Netherlands	10,375	13,919	7,227
Belgium	106,337	66,237	27,047
France	96,216	118,393	57,643
West Germany	60,724	88,643	43,498
Hungary	11,806	7,409	7,319
Switzerland	4,762	4,208	1,649
Spain	11,041	10,549	3,659
Italy	13,065	8,895	4,171
Greece	4,320	2,161	593
U.S.S.R.	36,506	19,825	11,926
Middle East			
Iraq	8,055	9,587	479
Israel	15,248	15,629	8,056
Kuwait	3,731	2,506	561
Saudi Arabia	63,813	147,530	133,111
Jordan	2,160	4,307	644
Arab Emirates	6,722	5,434	1,825
Iran	573	1,913	2,606
Asia and Pacific			
India	2,791	2,075	2,442
Thailand	3,112	1,988	1,206
Singapore	19,919	15,489	6,311
Malaysia	3,331	2,411	1,137
Indonesia	2,455	3,181	2,078
Philippines	5,241	5,328	1,716
Korea	5,260	4,389	2,714
Japan	21,878	19,181	11,126
Australia	199,503	218,132	27,404
New Zealand	8,850	9,152	1,635
Africa			
Algeria	6,200	5,050	4,757
Libya	16,025	2,731	822
Sudan	5,974	11,545	5,671
Nigeria	10,633	6,666	635
Egypt	28,996	14,634	5,577
Rep. South Africa	94,929	63,923	28,583
Senegal	1,059	3,481	283
Zimbabwe	995	3,532	2,218
Total U.S. Exports, Farm & Industrial Equipment	$2,942,117	$2,378,282	$970,860

Source: U.S. Dept. of Commerce, Bureau of Industrial Economics, Office of Producer Goods.

Wheel Tractors, Attachments and Parts, Value of Shipments, 1978-1982

(In thousands of dollars)

	1982	1981	1980	1979	1978
Wheel Tractors, Farm Type	2,192,635	3,066,418	2,761,480	2,901,693	2,264,398
Wheel Tractors, Non-Farm	68,692	97,257	115,154	165,506	132,694
Attachments for Wheel Tractors, Farm and Non-Farm	40,911	44,965	48,066	69,353	36,527
Parts for Wheel Tractors, Farm and Non-Farm	292,331	421,320	469,505	255,726	263,312
Wheel Tractor Chassis, Shipped as Part of Shovel Loader/Backhoe	230,031	315,639	306,736	351,306	278,269
TOTALS	**2,824,600**	**3,945,599**	**3,700,941**	**3,743,584**	**2,975,200**

Source: U.S. Dept. of Commerce, Bureau of the Census, Current Industrial Reports, Tractors (M35S).

Farm Machinery and Garden Equipment, Attachments and Parts, Value of Shipments, 1978-1982

(In thousands of dollars)

	1982	1981	1980	1979	1978
Planting, Seeding and Fertilizing Machinery	661,328	802,378	680,743	652,944	522,416
Harrows, Rollers, Pulverizers, Stalk Cutters	349,282	552,491	555,377	601,262	462,419
Plows	151,661	233,199	245,875	273,496	203,617
Harvesting Machinery	2,137,432	2,579,889	2,207,075	2,133,516	1,815,631
Haying Machinery	544,898	711,748	778,199	674,621	533,738
Farm Dairy Machines and Equipment	109,151	159,961	143,372	134,301	108,920
Sprayers and Dusters	250,050	248,491	254,083	245,368	197,931
Farm Elevators and Blowers	114,092	117,986	140,809	173,492	157,168
Cultivators and Weeders	200,504	235,994	275,793	275,519	206,125
Machines for Preparing Crops for Market or Use	276,309	319,425	340,083	384,916	356,008
Farm Poultry Equipment	102,389	144,939	174,931	223,333	159,452
Hog Equipment	37,867	41,530	63,951	120,728	95,226
Other Barn and Barnyard Equipment	198,539	257,298	274,220	306,942	251,587
Garden Tractors, Motor Tillers	NA	NA	NA	NA	686,375
Farm Wagons, Other Farm Transportation Equipment[1]	154,551	212,087	207,105	276,557	247,779
Irrigation Systems	253,020	349,237	308,974	234,412	161,348
Commercial Turf, Mowing Equipment	193,391	191,147	200,666	119,189	NA
Other Turf, Grounds Care Equipment	38,396	40,743	35,430	33,008	NA
Consumer Nonriding Lawn, Garden, Snow Equipment	1,253,782	1,167,768	1,374,557	1,444,126	NA
Consumer Riding Lawn, Garden, Snow Equipment	959,728	899,576	953,403	1,047,080	NA
TOTALS	**7,987,370**	**9,265,887**	**9,215,006**	**9,354,810**	**5,479,495**

[1] Data for 1978 include operator cabs in attachments and parts for these items.

NA – Not available or not applicable.

Source: U.S. Dept. of Commerce, Bureau of the Census, Current Industrial Reports, Farm Machinery and Lawn and Garden Equipment (MA-35A).

Shipments of Farm Machines and Equipment

(In units, 1978-1982)

Type of Farm Equipment	1982	1981	1980	1979	1978
Balers, hay (all types):					
Bales under 200 lbs.	10,130	15,936	17,065	20,867	22,659
Bales over 200 lbs.	14,302	23,213	32,446	31,443	21,323
Blowers (includes forage type, combination grain-forage type)	3,673	6,771	9,752	11,526	12,018
Cabs (metal), farm tractor	9,044	10,597	10,565	49,259	54,651
Cabs, other equipment	4,739	6,269	4,051	4,648	3,995
Combines, grain, pull-type and self-propelled	22,726	32,062	28,502	32,400	32,020
Corn heads	7,228	17,107	14,601	20,052	18,629
Cotton strippers (all types)	NA	NA	2,566	1,279	1,900
Cultivators, corn and cotton types	14,621	25,957*	28,726*	37,939	38,355
Cultivators, field:					
Pull-type	6,248	9,385	14,897	19,520	13,440
Mounted	1,628	3,044	5,257	4,731	5,262
Cultivators, rotary:					
Ground driven, sections and machines	9,987	15,025	20,355	16,480	16,794
Ground driven, integrally mounted				11,466	12,214
Power driven		456	486	700	628
Cultivators and weeders, other	25,935	30,936	47,727	39,153	42,148
Cutters and shredders or rotary mowers (pto):					
Flail-type	7,953	9,541	12,149	12,747	9,521
Horizontal blade-type	58,438	66,944	75,677	95,045	72,469

See footnotes at end of table.

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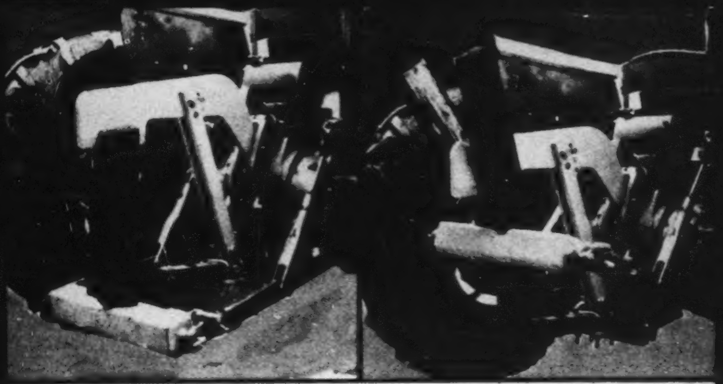

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Type of Farm Equipment	1982	1981	1980	1979	1978
Diggers, peanut (shakers and windrowers but not combines)	974	685	1,233	1,847	2,002
Combines, peanut		270	880	1,632	1,974
Distributors (fertilizer):					
Dry	4,681	6,129	6,254	11,754	11,522
Liquid	5,952	8,841	10,070	7,196	6,503
Anhydrous Ammonia	3,060	6,094	6,693	7,178	6,455
Dryers, grain, hay and seed batch type, pto or electric-motor operated	4,335	5,413	7,899	9,809	9,355
Continuous flow-type	835	1,348	1,419	1,755	2,306
Heated air units	22,178	12,553	14,983	21,573	28,290
Dusters, power, all types	493	859	794	727	574
Elevators, portable:					
Single chain	3,200	5,507	7,316	8,224	7,211
Double chain	3,100	3,074	6,680	9,446	8,787
Auger-type, under 6-in. dia.	14,365	17,607	25,725	35,585	31,662
Auger-type, 6-in. dia.	7,639	8,373	27,885	56,809	79,401
Auger-type, over 6-in. dia.	19,354	17,537	23,809	59,658	81,664
Elevators, stationary and other	97,837	89,034	33,268	38,734	32,355
Fans, crop drying and aeration	37,263	27,452	26,162	51,441	59,912
Grain drills, fixed-frame, all types	16,878	21,861	19,448	NA	NA
Grain heads for combines	28,714	48,656	46,162	50,177	50,609
Grinder-mixers, stationary and portable	4,657	8,031	14,152	18,888	16,907

See footnotes at end of table.

(More...)

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Shipments *(continued)*

Type of Farm Equipment	1982	1981	1980	1979	1978
Harrows, disk	29,467	51,639	67,676	85,375	76,857
Harrow sections (spike-, spring-, tine-tooth and power)	59,535	75,246	96,893	120,695	98,108
Harvesters, beet	161	289	246	111	312
Harvesters, forage, field, shear-bar type, self-propelled and pull	5,316	7,309	12,761	14,006	12,969
Attachments for shear-bar type, pickup and cutter-bar hay units	6,189	8,999	9,785	10,398	10,946
Row crop units, all sizes	5,707	6,857	11,800	13,578	13,532
Flail-type, including discharge spouts	1,050	2,259	3,062	3,080	3,972
Harvesters, potato	345	387	258	362	758
Harvesting machinery, other	4,237	7,816	8,108	11,972	13,566
Levelers or scrapers	4,089	6,122	6,931	165,346	160,526
Loaders, field, for baled hay	2,424	2,868	6,457	6,890	6,160
Loaders, tractor mounted, farm	17,243	23,322	36,547	69,294	42,582
Mills, feed, farm size (includes grinders and crushers of the hammer, burr or roller types	4,197	6,481	8,035	11,077	10,614
Mixers, feed, farm size	1,915	3,094	3,162	4,108	3,578
Mowers, cutter bar-type	6,550	7,687	8,586	8,435	12,134
Mower-conditioners, self-propelled and pull-type	20,051	31,059	38,071	35,039	29,921
Planters, corn and cotton, all types	108,394	163,096	156,482	NA	NA
Planters, row crop units (quantity in number of rows)				36,887	37,764

See footnotes at end of table.

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Type of Farm Equipment	1982	1981	1980	1979	1978
Plows, chisel or sweep type:					
Pull-type	4,921	6,738	14,313	15,455	12,090
Mounted	4,061	4,618	6,094	9,703	10,501
Plows, disk-chisel combination	4,105	6,059	3,195	NA	NA
Plows, disk, 1-way, 2-way (harrow, cylinder, great plains, all sizes)	3,010	4,832	8,302	NA	NA
Plows, subsoiler				8,321	6,964
Plows, terracing and ditching	1,039	1,756	2,383	2,308	2,039
Plows, moldboard					
Pull-type, one-way	994	2,503	3,263	3,873	2,666
Mounted, 1-way	3,642	6,111	8,680	13,224	11,852
Semi-mounted, 1-way	2,196	11,485	11,817	18,883	14,099
Pull-type and mounted, 2-way	2,262	3,297	2,999	3,577	3,473
Plows, other (except snow)	4,765	4,654	6,111	2,610	2,891
Rakes, hay, side-delivery,	10,089	13,615	19,707	19,121	20,602
Sprayers, field and row crop type:					
Power, self-propelled	2,330	2,010	3,516	4,257	3,590
Power, tractor-mounted	18,802	24,250	25,549	31,089	22,368
Power, non-tractor-mounted	5,244	8,898	14,089	16,810	14,142
Sprayers, power, not field or row crop type	6,552	6,203	7,444	6,896	5,836
Sprayers, power, air-carried	5,801	6,996	6,286	9,856	8,019
Spreaders, manure:					
Conveyor type	9,067	11,802	17,029	16,586	16,528
Tank type	2,533	4,540	7,188	8,772	7,584
Stackers, hay	NA	NA	1,175	1,806	1,442

See footnotes at end of table.

(More...)

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Shipments *(continued)*

Type of Farm Equipment	1982	1981	1980	1979	1978
Tillage equipment, combination roller/harrows, disk or coulter, field cultivators, disk or coulter/spring tooth	3,310	6,356	8,193	8,527	8,384
Tool bars, basic units, pull, mounted	3,389	4,416	4,277	7,246	6,715
Tractors, tracklaying type	8,476	15,789	18,208	19,812	22,057
Tractors, wheel					
Farm type	65,165	118,209	118,240	159,973	136,240
Non-farm type	4,728	7,480	10,029	18,452	16,741
Transplanters and broadcast seeders	21,308	23,854	20,872	43,672	27,296
Wagons, farm type, chassis only, and trailer gear	26,205	42,249	46,642	53,247	53,257
Wagon boxes and racks for mounting on wagons and trailer gear					
Manual unloading or dump	9,675	14,621	16,998	23,342	23,143
Gravity unloading, grain type	9,282	13,506	24,028	39,377	31,072
Power unloading	9,500	14,864	18,038	19,950	18,599
Wagon boxes with integral running gear	3,385	5,559	5,737	8,136	7,206
Windrowers for grain, pull-type	NA	NA	828	819	617
Windrowers for hay, self-propelled	NA	NA	7,163	5,841	4,098

In some cases, I&T has combined data because of space limitations. If you need more information from MA-35A, write us.
DATA: Current Industrial Reports, Series MA-35A, Bureau of the Census.
NA—Not available or not applicable.

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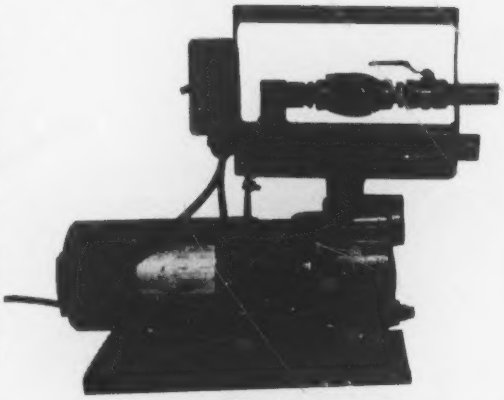

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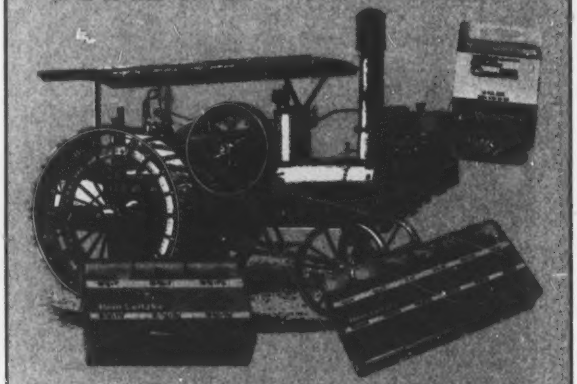

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Auctions *(Continued from page 4)*

4430 diesel, cab, duals, 1976 (Excellent)	13,800
4430 diesel, 1973 (Fair)	6800
4240 diesel, cab, duals, 1979 (Excellent)	17,750
4230 diesel, cab, 1976 (Excellent)	14,500
4020 diesel, 1967 (Good)	5200
4020 diesel, 1965 (Fair)	4200
3020 diesel, 1970 (Good)	6500
3020 diesel, 1968 (Rough)	3250
3020 diesel, 1964 (Fair)	3600*
2840 diesel, cab, 1979 (Good)	7800
2840 diesel, cab, 1978 (Good)	7400
2840 diesel, 1978 (Good)	7200
2040 diesel, 1979 (Good)	5150*
1530 diesel, 1975 (Good)	3750
820 diesel, 1971 (Good)	3700
420, 1957 (Good)	1100*

LONG TRACTOR

384 diesel, (Fair)	1550

OLIVER TRACTORS

2-105 diesel, 1976 (Fair)	5550
2-105 diesel, 1975 (Fair)	5300*
550 diesel, 1958 (Fair)	925
550 diesel, 1968 (Fair)	1450

YODER & FREY, INC.
Archbold, Ohio
September 13, 1983

INTERNATIONAL HARVESTER TRACTORS

Cub, 1948 (Rough)	1025*
H, 1944 (Fair)	5600
H, 1940 (Fair)	620*
H,	250
H, 1946 (Fair)	450*
H, 1940 (Fair)	625
M, diesel,	500
Sup. M, 1952 (Good)	950
W4,	275
130, 1958 (Fair)	1850
300, 1957 (Fair)	750*
400, 1957 (Fair)	760*
460, 1961 (Rough)	1000
504, 1966 (Fair)	1500*
504, 1965 (Fair)	2350
560 diesel, 1960 (Good)	1900
574 diesel, 1973 (Fair)	2925
674 diesel, ldr., 1970 (Good)	4600
706, 1963 (Rough)	2000*
706 diesel,	2450
706, 1964 (Rough)	3200*
756 diesel, 1968 (Fair)	3900*
806, 1963 (Rough)	1800*
806, 1964 (Good)	4100
856 diesel, 1968 (Fair)	4800*
866 diesel, 1975 (Good)	6500
866 diesel, 1976 (Excellent)	8300*
986, 1979 (Excellent)	12,750*
1066, 1975 (Fair)	6000*
1066, 1975 (Good)	6150*
1066, 1974 (Fair)	6000*
1086, 1979 (Good)	13,500*
1206, 1965 (Fair)	4900*
1206, 1963 (Fair)	6800*
1466, 1975 (Fair)	6100*
400,	500
A, cult., 1941 (Rough)	550
A, cult., 1946 (Fair)	610*
A, cult., 1943 (Fair)	1300
A, cult., 1945 (Rough)	650
B275, ldr., (Fair)	1325
M,	325
M, 1952 (Rough)	650
M, 1950 (Fair)	800
M, 1950 (Rough)	675*
M, 1950 (Rough)	525
Sup. C, 1952 (Fair)	925*
C, 1949 (Rough)	375*
C, 1946 (Rough)	800*
B, 1947 (Fair)	410
BN, 1945 (Fair)	725*
Sup. C, cult., 1951 (Fair)	525*
3688, 1982 (Excellent)	23,000*

WHITE TRACTOR

4-150, 1977 (Fair)	9300*

JOHN DEERE TRACTORS

A, 1943 (Rough)	250*
A, 1952 (Fair)	610
B, 1944 (fair)	375*
B, 1941 (Rough)	280*
B, 1946 (Fair)	350*
B, 1945 (Rough)	225
B, 1944 (Rough)	240
B, 1945 (Rough)	200
R, 1950 (Fair)	1350
60, 1955 (Good)	1150*
60, 1956 (Fair)	500
60, 1956 (Fair)	675
70, 1957 (Rough)	550*
430, ldr., 1959 (Fair)	2000
720, 1958 (Good)	2050*
1010, 1961 (Fair)	1850*
1020, (Fair)	4200
3010, 1965 (Fair)	2425
3020 diesel, 1968 (Fair)	3600*
3020 diesel, 1968 (Good)	3625
4010, 1963 (Fair)	2675
4010, 1962 (Fair)	3100*
4010, 1963 (Rough)	2450*
4010, 1961 (Fair)	3550
4020 diesel, 1967 (Fair)	4200*
4020 diesel, 1966 (Fair)	3850*
4020 diesel, 1966 (Fair)	5200*
4020, 1965 (Fair)	3300*
4020 diesel, 1965 (Fair)	5650
4020, 1967 (Fair)	3600
4020, 1965 (Fair)	5000*
4020, 1970 (Good)	6200
4020, 1965 (Fair)	4650
4320, 1972 (Fair)	6000*
4320 diesel, 1971 (Good)	5500*
4320 diesel, 1971 (Good)	7100*
4320 diesel, 1972 (Good)	7400*
4430 diesel, 1975 (Good)	10,500*
4430 diesel, 1976 (Fair)	10,250

OLIVER TRACTORS

88, 1954 (Rough)	875
88 diesel, 1952 (Fair)	760
88 diesel, 1953 (Fair)	610
550, 1961 (Good)	3600
880 diesel, 1958 (Rough)	800
1235, (Fair)	3800
1600, 1961 (Good)	2800*
1855 diesel, 1972 (Fair)	4100*
1855 diesel, 1972 (Rough)	4250*
1855 diesel, 1973 (Good)	5300*
1955, 1973 (Good)	5600*
55 diesel, 1952 (Rough)	1050*
55, 1954 (Fair)	1500

ALLIS-CHALMERS TRACTORS

B, 1941 (Rough)	350
B, 1944 (Rough)	475
CA, 1950 (Fair)	410
WC, 1937 (Rough)	110
WC, 1936 (Rough)	125*
WC, 1937 (Rough)	250*
WD, 1944 (Fair)	430
WD, 1944 (Rough)	320

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WD, 1947 (Rough)	500
WD-45, 1952 (Fair)	925*
D-15, 1965 (Fair)	1825*
D-19, 1967 (Fair)	1700*
D-21, 1967 (Fair)	3200*
D-21, 1967 (Fair)	3800*
190 XT, diesel, 1970 (Fair)	3250
190 XT, diesel, 1969 (Fair)	3550
190 XT, diesel, 1968 (Rough)	3300*
190 XT, 1969 (Fair)	3550
200 diesel, 1974 (Good)	6500*
7040 diesel, 1976 (Good)	7300*
7050 diesel, 1974 (Good)	7700

MINNEAPOLIS-MOLINE TRACTORS

Jet Star, 1962 (Fair)	1300*
M-670, 1965 (Fair)	1950*
G-705 diesel, 1965 (Rough)	1600*
G-900 diesel, 1967 (Good)	3500
R,	125

MASSEY-HARRIS TRACTORS

33, 1947 (Rough)	280
101,	185
101,	190

CASE TRACTORS

320,	2400
430 diesel, 1963 (Rough)	1000*
500, 1956 (Rough)	950*
530, 1966 (Rough)	1275
530, ldr., 1969 (Fair)	2475
530, 1965 (Fair)	2400*
600 diesel, 1964 (Fair)	1000*
930 diesel, 1967 (Fair)	3000*
970, 1971 (Fair)	6050*
970, 1972 (Fair)	5000*
1030 diesel, 1967 (Rough)	3000*
1070, 1972 (Fair)	7000*
1070, 1971 (Rough)	6600*
1370, 1976 (Good)	9600*
1370 diesel, 1977 (Fair)	8300*
SC,	125

FERGUSON & MASSEY-FERGUSON TRACTORS

20, 1945 (Fair)	750*
20,	600
30, 1953 (Fair)	1000*
35,	3750
65, 1960 (Fair)	1600*
65, 1962 (Rough)	1750
135, 1968 (Rough)	3225
150, 1969 (Good)	2950
165 diesel, 1968 (Fair)	3000*
165 diesel, 1970 (Fair)	3400
165 diesel, 1970 (Fair)	3300*
165, 1968 (Rough)	2900*
165, 1972 (Fair)	3525
165, 1970 (Fair)	3000*
165, 1971 (Good)	3175
180, 1969 (Fair)	4200
265, 1981 (Good)	8900
1130 diesel, 1967 (Rough)	3525
1155, 1970 (Rough)	3800*
2805, 1979 (Good)	8200*

FORD TRACTORS

8N, 1947 (Rough)	875
9N, 1943 (Rough)	750
9N, 1940 (Fair)	1075*
9N, 1940 (Fair)	560
9N, 1942 (Fair)	1175
9N, 1941 (Fair)	850
9N, 1950 (Fair)	1435
601, 1957 (Fair)	1720*
801, 1957 (Good)	1450
801, 1959 (Fair)	1150
861, 1958 (Rough)	2325
4000, 1972 (Good)	3600*
4000, 1964 (Rough)	1400*
4000 diesel, 1969 (Rough)	2900*
5000, 1967 (Fair)	3200
5000, 1975 (Fair)	5200*
6000 diesel, 1964 (Rough)	1000*
9600 diesel,	8000
6600,	10,900
Jub., 1953 (Fair)	1200

COCKSHUTT TRACTORS

45, 1959 (Fair)	1900
1255, (Good)	3100*

DAVID BROWN TRACTORS

990 diesel, (Fair)	975

NOTES:
Prices reported are for individual sales at wholesale on an "as is," "cash and carry" basis. Prices reported are **not** averages.

Condition Classifications:
EXCELLENT: Engine in perfect condition, 400 to 600 hours of use. Rubber—80% tread remaining, no breaks or cracks. Paint—original and bright. General appearance: excellent.

GOOD: Engine in good running condition. Rubber—70% tread remaining, no breaks or cracks. Paint—original or a good repaint job. General appearance: good over-all.

FAIR: Engine possibly in need of a minor overhaul. Rubber—60% tread remaining, some cracking evident in sidewalls. Paint—only fair, weathered and some rust apparent. General appearance: worn, some dents, minor parts (gage covers, etc.) missing or broken.

ROUGH: Engine obviously in need of a major overhaul. Rubber—smooth. Paint—scarred, weathered, rusty. General appearance: dents, ruptures, broken parts, loose wires, components (such as lights) broken, missing or inoperative.

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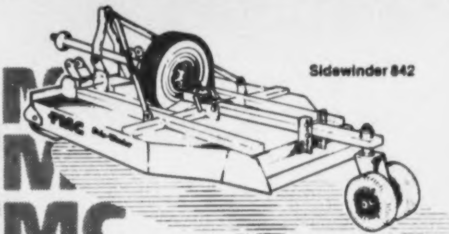

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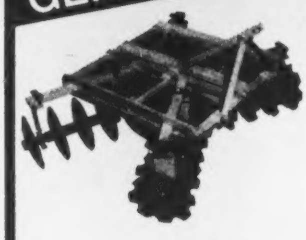

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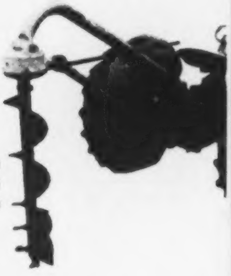

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TOUCHING THE FUTURE

Part 1:
1984 and Beyond

Manufacturers Edition

Is Parts Service Too Good?

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Editorial, advertising
and circulation correspondence
should be addressed to:
9221 Quivira Rd.
P.O. Box 12901
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(a suburb of Kansas City, Mo.)
Telephone (913) 888-4664
Telex: 42-4156; Answerback
Intertec OLPK

EDITORIAL
Bill Fogarty, Editor
Irma Allread, Associate Editor
Scott R. Nesbitt, Associate Editor
Kevin Callahan, Art Director
Anita Blattner, Graphic Designer
Pat Blanton, Editor, Product File
Tom Fournier, Editor, Red Book

Contributing Editors:
Frank Buckingham,
Agricultural Engineering
Glenn S. Hensley, Dealer Topics

CIRCULATION
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December 1983 • Vol. 98 • No. 14

TOUCHING THE FUTURE: PART 1, 1984 AND BEYOND

I&T went to several sources, including some you don't hear from very often, or often enough—a director of service, association managers, a tomorrow-oriented dealer—and asked for some insights about what's coming. Also: some manufacturers' and politicians' insights.

8: **'Free but Fair Trade.'** Chairmen of the Senate and House Ag committees favor the market, not government, as farm income source.

10: **They Never Stop Planning at Koenig Equipment.** The future? This Ohio dealership will be ready—or is already there.

14: **Will Dealer Associations Change?** They'll have to, says Dave Lucy, who manages one. How about that Industry Relations Fund?

16: **Shortliners Ponder Marketplace Trends.** Will farmers buy from catalogs? Will majors try to block shortline competitors?

18: **Advice, Encouragement, from a Departing Pro.** Harold Halter, bowing out as FEMA manager, likes members' future, with some warnings.

20: **What Will It Be Like 'Back in the Shop'?** Deere's general service manager sees an electronic future, more training, need for profit.

22: **Executive Outlook.** A sampling of statements on next year by industry officials, all members of the FIEI board of directors.

23: **Searching Out 'Excellence.'** The FIEI calls excellence "the magic of the future" and takes that theme for its 90th annual convention.

26: **How Clark Is Helping Dealers Use Computers.** With high-tech hardware, Clark Equipment Co. has built a computer communications network that gives dealers a wide choice of in-house computer systems.

30: **Shortliners See Brighter Days.** Optimism tinged with caution peeps out at the annual FEMA convention, where new officers are installed.

32: **Meyer Heads Wholesalers.** FEWA gets a new president at its convention, where sessions continue the focus on intense internal management.

34: **Finding the Right Mechanic.** A new test may relieve some of the problems in hiring competent employees for the service shop.

38: **Try a Little Strategic Pricing.** Buying right and selling smart gives this dealership a parts department sales booster.

42: **AIMRA Elects Clayton Roberts.** The manufacturers' reps meet to install officers and consider trends and computers.

On the cover: The scene is Walt Disney's EPCOT, which is a focus on tomorrow. It seemed to set the theme for this issue.

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I&T Update

October: Big Tractors Take a Jump

The October flash report of the Farm & Industrial Equipment Institute brought some good tidings: Big tractor sales were up strongly from October, 1982. Volume for the year on all tractor sizes was thus down only 3 per cent. Some observers, however, were suggesting that the percentages were more attractive than the margins, since inventory is still considered an industry problem. Meanwhile, unit sales volume in all other product groups of the report declined.

Unit Retail Sales

	October			January-October		
	1983	**1982**	**Pct. Change**	**1983**	**1982**	**Pct. Change**
Farm Wheel Tractors:						
2-wheel drive:						
Under 40 hp	3,557	3,304	+ 7.7	40,643	37,922	+ 7.2
40-99 hp	3,616	3,991	− 9.4	32,810	35,969	− 8.8
100-139 hp	2,139	1,668	+ 28.2	12,815	16,164	− 20.7
140 hp and over	2,198	945	+ 132.6	11,134	8,799	+ 26.5
Total 2-wheel drive	**11,510**	**9,908**	**+ 16.2**	**97,402**	**98,854**	**− 1.5**
4-wheel drive:						
under 200 hp	316	250	+ 26.4	1,679	2,593	− 35.2
200 hp and over	444	372	+ 19.4	2,470	3,101	− 20.3
Total 4-wheel drive	**760**	**622**	**+ 22.2**	**4,149**	**5,694**	**− 27.1**
Total All Tractors	**12,270**	**10,530**	**+ 16.5**	**101,551**	**104,548**	**− 2.9**
S-P Combines	2,025	3,011	− 32.7	10,202	12,220	− 16.5
Balers (200-lb. bales)	330	531	− 37.9	8,642	8,406	+ 2.8
Forage Harvesters (Shear-bar type)	655	864	− 24.2	3,744	4,582	− 18.3
Mower Conditioners	574	838	− 13.5	13,528	13,146	+ 2.9

Nine-Month Imports Show 5 Pct. Rise

Imports of farm equipment were up slightly in the first nine months of 1983 compared with the same 1982 period—a five per cent rise to $978 million. The mild net increase masked some sharp rises and declines from individual countries, however.

Imports from America's leading trade partner, Canada, were off 21 per cent to $315 million. But there were big jumps, particularly in agricultural tractors, by West European nations. For instance, West Germany sent $97 million in tractors in the 40-80 horsepower range, a tripling of dollar volume over 1982. Britain sent $51 million in that horsepower range, more than double last year's volume.

Total imports from the United Kingdom were $123 million for the first nine months, up 70 per cent. From West Germany, the total was $190 million, up 56 per cent.

Italian and Japanese imports remained unchanged in dollar value at $73 million and $143 million respectively. Japan increased its import volume on under-20-hp units and in the 40-80 horsepower group but cut back in other major areas.

The biggest import categories were tractors in the 40-80-hp bracket—$205 million, up 127 per cent—and tractor parts—$143 million, off 5 per cent.

Hesston Aims at Finishing 1983 In the Black

Hesston Corp.'s third quarter (ended Sept. 30) produced earnings of $2.67 million on sales of $54 million. For the nine months, earnings were $4.69 million on sales of $155.5 million.

In 1982, Hesston lost $2.65 million on sales of $45 million in the third quarter and $2.25 million on sales of $166.2 million.

Howard Brenneman, president, told the Hesston board of directors that the farm equipment market is "more competitive and difficult than anticipated due to the amount and variety of terms, discounts and rebates being offered." But he added that a program to enlist more Hesston dealers as suppliers of the complete line, including tractors, had made progress.

The company anticipates at least a break-even result from 1983 operations despite the last quarter being a traditionally low period for shipments to dealers.

Front-Wheel Assist Takes 26% in Canada

According to the Canadian Farm & Industrial Equipment Institute, front-wheel assist was a part of an estimated 26 per cent of all two-wheel drive tractors sold in Canada this year.

At the group's annual meeting Nov. 10 in Toronto, the outlook report issued by its Marketing Committee estimated that 1983 will see total tractor sales of 18,411 units. Of 16,120 two-wheel-drive types sold, 4,207 were reported as having front-wheel assist, or 26 per cent.

Of the 3,041 units sold in the under-40-hp bracket, 59 per cent had front-wheel assist; 1,870 of the 7,192 units in the 40-99-hp bracket (26 per cent) had front-wheel assist; 9 per cent—540 units—of the 5,889 tractors in the over-100-hp group had front-wheel assist.

Other aspects of the Canadian outlook report will appear in the next issue of I&T. Expectations are for a 10 per cent improvement overall in 1984.

Wholesaler Forms Equipment Credit Company

Lindsay Bros., Inc., Milwaukee, Wis., farm equipment wholesaler, has formed Lindsay Financial Corp. to provide financial services to farm equipment buyers, according to Stuart C. Lindsay, chairman and chief executive officer. It is believed to be the first entry by a farm equipment wholesaler into retail and wholesale financing.

Briefly....

Hiniker Co., Mankato, Minn., maker of minimum tillage planters and other equipment, has been sold by Kenneth Hiniker to the Coster Co., Chicago. Hiniker will remain as president.

Richard McElheny, former president of Farmhand, Inc., has been confirmed by the U.S. Senate as assistant secretary of commerce for trade development. He had previously been director general of the department's U.S. and Foreign Commercial Services.

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IS PARTS SERVICE TOO GOOD?

By Scott R. Nesbitt

A study of parts distribution among FIEI manufacturers indicates that parts distribution is costing too much. Does the problem lie in attitudes and policies, or is high cost an unchangeable fact of life for the ag-industrial industry?

■COMPANIES that build farm and industrial equipment spend too much money supplying service parts to their customers.

That's the conclusion Herbert W. Davis has reached after three years of studying parts costs for the FIEI.

"The numbers don't indicate that we're getting what we're paying for," Davis told 75 ag-industrial ex-

(More...)

1982 Parts Distribution Performance

Averages for 31 Survey Respondents, by FIEI Division

The Cost of Parts Returns

	Sales in $1000 Performance in Percentage		
	FED	AED	ICED
Total Gross Sales	$439,000	$264,000	$49,000
Total Gross Parts Sales	$108,000	$ 41,000	$30,000
Less Parts Returns			
Miscellaneous	3.09%	0.89%	0.98%
Annual	3.69	1.84	1.02
Closeout/special	3.56	0.83	0.59
Subtotal Returns	9.98%	3.56%	3.63%
Less Warranty Claims	3.20%	3.68%	1.14%
Discounts & Allowances	2.36	1.43	4.25
Net Parts Ship[illegible]s	84.09%	91.33%	92.01%

Total Operating Costs

	Percentage of Sales		
Distribution Costs:	FED	AED	ICED
Inbound and internal transportation costs	1.42	1.05	0.87
Outbound transportation costs	1.37	1.56	0.22
Identification and unit packaging	1.13	0.42	1.02
Warehouse operation	8.31	5.87	4.33
Total Distribution Costs	12.15	8.91	6.44
Administration Costs:			
Materials and procurement	1.19	2.12	1.28
Customer service	2.04	0.50	5.48
Inventory carrying costs	8.54	5.48	5.71
System and data costs	1.43	1.08	1.47
Other administrative costs	1.86	0.48	2.22
Total Administration Costs	14.58	12.17	13.88
Marketing Costs:			
Parts pricing and catalogs	0.40	0.17	0.54
Selling and commissions	0.78	0.92	0.67
Merchandising (promotions)	0.50	0.93	0.25
Total Marketing Costs	1.68	2.02	1.46
Total Operating Percentages	28.88	23.10	29.52

Selling Parts
(continued)

ecutives last month at the FIEI Parts Committee three-day seminar on "Parts, Money, Products."

"Perhaps the area for greatest improvement is through a change of the underlying policies, the philosophy of operation in this industry," Davis said in presenting the results of the committee's third annual survey of service parts distribution costs.

"As things stand," the analyst said, "the consumer can drive the manufacturer to maintain a 1951 tractor. I know. I own three of them myself."

Customer service, with a fill rate of 93 to 96 per cent on parts, is very high compared to other industries, Davis said.

"But the costs are also very high, averaging about 25 per cent of gross sales revenues of parts," he said. "In our experience, no other industry is within striking distance of that level of costs."

The survey in 1982 drew responses from 31 FIEI member firms, including 18 from the farm equipment division (mobile field units), six from the agri-equipment division (fixed farmstead items), and seven from the industrial-construction division. In 1981 there were 26 responses, and 13 in 1980.

Three big problems

A specialist in analyzing market data and physical distribution for several industries, Davis spotlighted three major reasons for the high costs.

Inventory turnover is slow, creating costs to warehouse, catalog and organize large numbers of slow-moving parts.

Carrying costs are high, because slow-movers use up costly warehouse space and tie up high-interest money.

Customer service is exceptional, spurred by a desire to get even the oldest parts out to customers as quickly as possible.

Jim Ebbinghaus, vice-president of FIEI, noted that the survey figures confirm the general rule that 20 per cent of part numbers produce 80 per cent of the sales, which means 80 per cent of part numbers are slow movers.

"One of the messages," Ebbinghaus said, "is that the farm equipment industry does more to meet the needs of customers than other industries. The theory is that good service on old equipment will lead to customer loyalty and purchases of new equipment of a particular brand.

"That way of doing business may be costly and some real savings might come from cutting back. But who wants to be the first to test that theory?" he asked.

Ebbinghaus noted that a USDA survey of a few years ago found that half the tractors produced 25 years ago were still in use on farms, creating a demand for older parts that may be slow movers.

Davis acknowledged the long life span of farm and industrial equipment, and concedes that "we may be locked in a high fixed-cost system.

"But don't be satisfied that costs are high because the level of service is high," he cautioned the assembled parts managers. "High cost doesn't mean good service. High cost comes

(More...)

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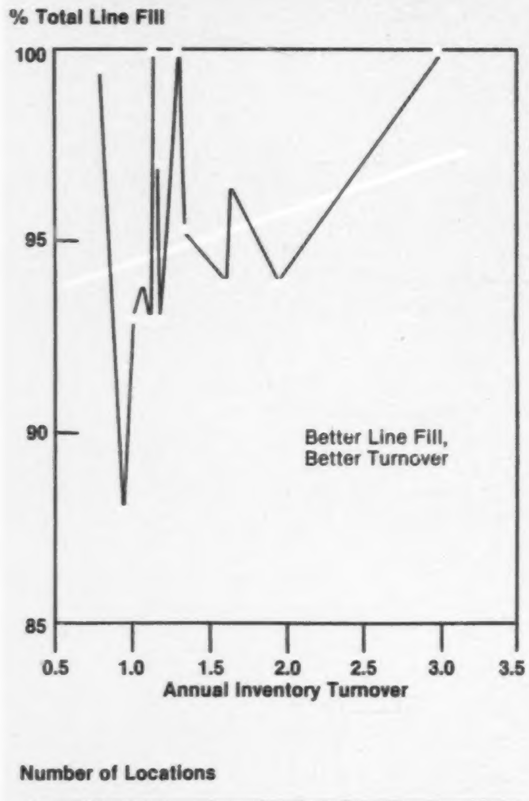
Inventory Turnover Trends

(1982 data, 18 member firms, FIEI Farm Equipment division)



All charts and tabular data courtesy FIEI Parts Committee, compiled by Herbert W. Davis & Co., 111 Charlotte Pl., Englewood Cliffs, NJ 07632.

Selling Parts
(continued)

from bad control."

Costly parts returns

The survey found that, in the farm equipment division, companies bought about 10 cents in returned parts for every dollar of new parts sold.

Davis said his research showed only two industries approach that 10 per cent return level. Cosmetics have a 10 per cent return, but he noted they deal in a non-serviced, high-profit consumer item. Pharmaceuticals' return rate runs about 5 per cent, largely because of dating laws on drugs.

The message, said Terry Sexton, Steiger Tractor parts manager and parts committee chairman, is "dealers have to be taught that parts returns are not an insurance policy against poor parts management."

James F. Wimpress, Massey-Ferguson's North American parts manager, said the cost of returns is emphasized by a study that found 85 per cent of returned parts were scrapped within 5 years.

Several parts managers said a portion of the returns to manufacturers is generated by buy-back laws that exist in 25 states. L. James Nelson, FIEI government relations director, noted in a presentation on buy-back laws that some states require repurchase at 100 per cent of current net price, with the average at 85 per cent of net price.

The survey did not specifically factor out the effect of buy-back laws on parts returns, but Davis said FIEI manufacturers have "rather liberal" return policies that add substantially to total parts distribution costs.

The cost of speed

Davis said the survey indicates that extra costs are associated with maintaining multiple warehouse facilities, which are supposed to put the parts stock physically closer to the customer.

Inventory turnover is poor compared to other industries, Davis said. Broken down by FIEI divisions, annual turnover rates were 1.38 for the FED; 2.23 for the AED, and 2.96 for the ICED.

"There's evidence that the smallest companies are the most efficient," Davis said. "The fewer stocking locations, the greater the inventory turnover. That's not unusual.

"Inventories increase with the number of stocking points. Line fill doesn't correlate with inventory level." In fact, he said, "inventory turn is better with better service to the customer.

"Somewhere in your system is a balance point between speed and cost of service. By closing warehouses, you may reduce costs and increase the fill rate on orders, but you may take more time to do it," Davis concluded.

Hugh D. Cotcamp, parts operations manager of Ford Tractor Operations, said the survey raised the issue of whether order fill was being analyzed as the dealer sees it, or as the manufacturer sees it. "Perhaps we need a more current measure of what's going on in the industry," he said. "Our survey has a key untouched factor, the time to turn around back-ordered parts, which would tell a lot about how well we're doing our job." I&T

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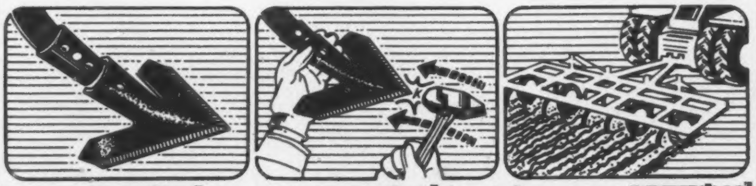

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AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

YODER & FREY, INC.
Archbold, Ohio
October 11, 1983

MASSEY-HARRIS TRACTORS

44, 1949 (Rough)	325
44 diesel, 1949 (Fair)	550*
333, 1954 (Rough)	520*

INTERNATIONAL HARVESTER TRACTORS

C, 1947 (Rough)	450*
C, 1948 (Rough)	650*
BN, 1948 (Fair)	525*
BN, 1947 (Fair)	400*
A, 1950 (Rough)	550*
A, 1948 (Fair)	720
H, 1950 (Fair)	575*
H, 1942 (Fair)	600*
Sup. C, 1951 (Fair)	625*
Sup. H, 1952 (Fair)	625*
Sup. H, 1951 (Fair)	660
Sup. M, 1952 (Rough)	775
Sup. M, 1952 (Fair)	775
300, 1955 (Fair)	750*
350 diesel, 1958 (Rough)	740
M, 1946 (Fair)	800*
M, 1947 (Rough)	620*
M,	400
M, 1950 (Rough)	600*
460, 1960 (Fair)	1400
504, 1966 (Fair)	2100*
504, 1966 (Fair)	1450*
504, 1965 (Rough)	1450
560, 1961 (Fair)	1300
560 diesel, 1960 (Fair)	1850*
574, 1973 (Fair)	3250*
554, ldr., (Fair)	4100*
656 diesel, 1970 (Fair)	3650
656, 1970 (Good)	4500*
674 diesel, ldr., 1970 (Good)	4600
706, 1964 (Rough)	2900*
706, 1963 (Rough)	2200*
706 diesel, 1966 (Good)	3000*
756 diesel, 1968 (Fair)	4300
806, 1964 (Fair)	4250*
806, 1964 (Fair)	4200
806, 1967 (Good)	2900*
856 diesel, 1970 (Fair)	5100*
856 diesel, 1967 (Fair)	5800*
856 diesel, 1969 (Good)	4100
966, 1980 (Excellent)	12,000
966, 1975 (Good)	6300*
1026, 1970 (Fair)	5800*
1066, 1975 (Fair)	5950
1066, 1975 (Fair)	6200*
1066, 1976 (Good)	7500
1066 diesel, 1976 (Good)	6500*
1066 diesel, 1976 (Good)	9050*
1086,	15,000
1206 diesel, 1966 (Good)	4700*
1206 diesel, 1965 (Fair)	6250*
1466 diesel, 1974 (Good)	8100*
1468 diesel, 1975 (Fair)	5100*
1486, 1979 (Excellent)	18,000*
1566, 1974 (Fair)	6600*

MINNEAPOLIS-MOLINE TRACTORS

Jet Star, (Fair)	1400*
M-670 G, (Fair)	1900*
G-1000, (Good)	2950
Z,	265
Z,	140
G, diesel, 1949 (Rough)	475

ALLIS CHALMERS TRACTORS

B,	310
C,	400*
CA, 1950 (Fair)	500*
WC, 1939 (Rough)	200*
WD, 1944 (Fair)	435*
WD-45, 1950 (Rough)	425*
WD-45,	680
D-14, 1964 (Rough)	1100*
D-14, 1966 (Fair)	925
D-15, 1965 (Fair)	1500*
D-17, 1964 (Good)	1750
D-21, 1967 (Fair)	4000*
185 diesel, (Fair)	5200
190XT diesel, 1970 (Fair)	3650
7030, 1974 (Good)	7300*
7030 diesel, 1975 (Good)	7000*

JOHN DEERE TRACTORS

A, 1943 (Rough)	475*
B, 1946 (Fair)	575
B, 1945 (Fair)	425
70, 1954 (Fair)	600
70, (Good)	570*
70, 1955 (Fair)	925*
420, 1958 (Fair)	1325
720 diesel, 1957 (Fair)	1950
2010 diesel, 1962 (Fair)	2175
2010, 1963 (Good)	2700*
2020 diesel, (Rough)	3300*
2630, 1975 (Excellent)	7000
3020 diesel, 1968 (Good)	4500*
3020 diesel, 1969 (Good)	5400
4010, 1963 (Fair)	3350
4010, 1964 (Good)	3000*
4020 diesel, 1965 (Fair)	5350
4020, 1967 (Fair)	3275
4020 diesel, 1965 (Good)	6450
4020 diesel, 1966 (Fair)	5750*
4240, (New)	26,000*
4320, 1973 (Good)	7850
4430, 1975 (Fair)	10,250*
5020, 1968 (Fair)	4400*
7520 diesel, 1973 (Fair)	13,000*

DAVID BROWN TRACTORS

990, (Rough)	750*

(More...)

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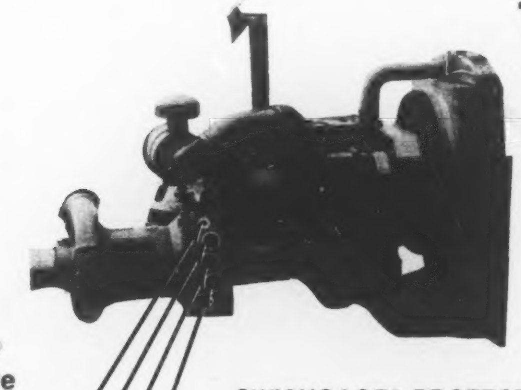

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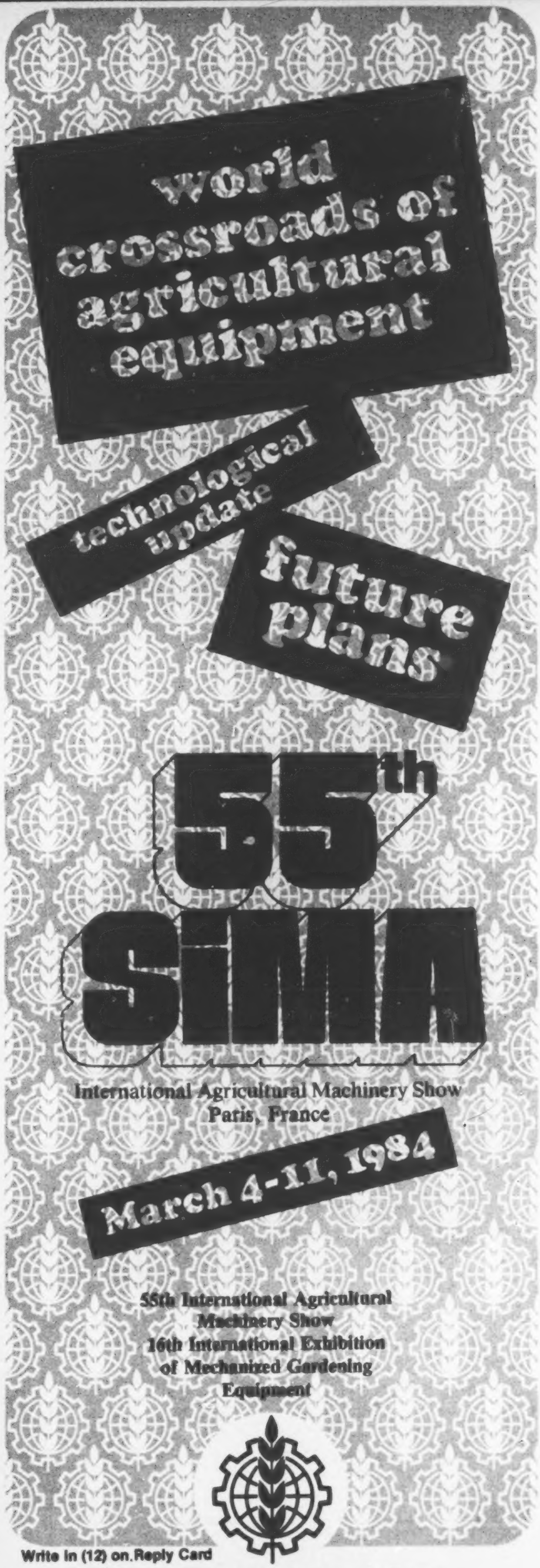
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Auctions *(continued)*

990, (Rough)	1900*
1200, (Rough)	2600*
1200, (Rough)	2500*

FORD TRACTORS

8N, 1946 (Fair)	1380*
8N,	1000
8N, 1952 (Fair)	1525
8N, 1950 (Rough)	960
9N, 1940 (Rough)	700*
9N, 1941 (Rough)	925
NAA, 1954 (Rough)	1450
3000 diesel, 1972 (Fair)	2600*
4000 diesel, 1970 (Rough)	2800*
4000, hoe/ldr.,	3150
4000, 1962 (Fair)	1200*
5000 diesel, 1973 (Good)	5600
5000, 1971 (Fair)	4900*
5000, 1970 (Fair)	2800*
6000, 1961 (Rough)	1250*
640, 1955 (Fair)	2100
TW-30, 1982 (Excellent)	26,000*
Dexta diesel, (Rough)	1925
Fordson Maj. diesel, (Rough)	600*
Jub. ldr., 1953 (Rough)	2100*
850, 1955 (Good)	2500*
960, 1957 (Rough)	1200

FERGUSON & MASSEY FERGUSON

TD-30, 1950 (Rough)	950*
TD-30, 1950 (Fair)	1300
50, 1965 (Fair)	1900*
65 diesel, 1964 (Good)	2500
65, 1960 (Fair)	1800
165 diesel, 1970 (Fair)	2950*
165, 1969 (Rough)	3100*
1155, (Fair)	6500*

COCKSHUTT TRACTORS

E-4, 1950 (Fair)	375*
1255, (Good)	3575
E-3, 1945 (Rough)	250*

OLIVER TRACTORS

88 diesel, 1949 (Fair)	975
880, 1959 (Rough)	950*
1955 diesel, 1974 (Good)	5200
1800, 1962 (Rough)	1200*
1855 diesel,	3500
55-diesel,	750*

WHITE TRACTORS

2-150, 1978 (Fair)	7000
4-150, 1976 (Rough)	10,250*
1855 diesel, 1973 (Fair)	4100*

CASE TRACTORS

500, 1957 (Rough)	900*
600, 1963 (Rough)	700*
530,	2500
580 hoe/ldr.,	5150
630, 1965 (Rough)	825
770, 1972 (Rough)	2450
830 diesel, 1965 (Fair)	3400*
870 diesel, 1972 (Fair)	4000*
870 diesel, 1973 (Fair)	5900
930, 1965 (Fair)	1400*
930 diesel, 1966 (Fair)	2700*
930 diesel, 1967 (Fair)	2750*
970, 1973 (Fair)	5550*
970, 1973 (Fair)	5400*
1030 diesel, 1965 (Rough)	2400*
1070, 1972 (Fair)	7000*
1070, 1975 (Rough)	6200
1370, 1976 (Fair)	8100*
2470 diesel, 1972 (Fair)	9000*
VAC, 1947 (Rough)	210
VAC, 1948 (Rough)	260*

ENLOW AUCTION CO.
Tulsa, Okla.
(October 8, 1983)

ALLIS-CHALMERS TRACTORS

D-14, 1958 (Good)	2050
D-15, 1962 (Good)	2700
190 XT, 1965 (Fair)	2250

CASE TRACTORS

D, 1953 (Fair)	260
430, 1964 (Good)	1800
530 diesel, 1966 (Good)	2425
1030 diesel, 1968 (Fair)	2200*

JOHN DEERE TRACTORS

B, 1945 (Fair)	180
420, 1957 (Good)	1500*
710 diesel, 1969 (Good)	2600
2020 diesel, 1970 (Good)	4150
3020 diesel, 1968 (Good)	2100*
4010 LP, 1962 (Fair)	3100*
530, 1959 (Fair)	1650*

FERGUSON TRACTORS

20, 1949 (Good)	1200
30, 1952 (Fair)	1050*

FORD TRACTORS

9N, 1942 (Fair)	950*
9N, 1944 (Good)	1350
9N, 1944 (Fair)	800*
9N, ldr., 1945 (Good)	1200
9N, 1947 (Good)	1250
8N, 1950 (Fair)	1200*
8N, 1952 (Good)	1425
NAA, 1953 (Good)	2350
601, 1957 (Fair)	1700*
641, 1958 (Good)	2100
850, 1954 (Good)	2000*
850, 1955 (Rough)	1475*
850, 1956 (Fair)	1750*
850, 1956 (Good)	1900*
801, 1958 (Fair)	1800*
861 diesel, 1961 (Good)	2850*
1300, mo., 1981 (Excellent)	3600*
1600 diesel, 1981 (Excellent)	4200
2000, 1962 (Fair)	1725
2000, backhoe-ldr., 1962 (Good)	3500*
2000, 1966 (Good)	2825
2000, 1968 (Good)	3105*
3000 diesel, 1967 (Good)	2959*
3500, 1966 (Fair)	2350
3500, 1968 (Good)	3800
4000, ldr., 1962 (Good)	3050
3600 diesel, 1981 (Good)	6250
3600 diesel, 1981 (Good)	6750
3600 diesel, 1982 (Excellent)	7750
4400, ldr., 1965 (Fair)	3000

INTERNATIONAL HARVESTER TRACTORS

Cub, mo., 1949 (Good)	1350*
Cub, mo., 1952 (Fair)	1250
Cub Loboy, mo., 1958 (Good)	1500*
Super A, 1950 (Good)	1050*
H, 1946 (Fair)	400*
M, equip., 1949 (Good)	1000
M, 1950 (Good)	575*
300, plow, 1955 (Good)	1450
350, 1957 (Fair)	850*
W-450 diesel, 1956 (Good)	900*
444 diesel, 1968 (Good)	2100
3444 diesel, backhoe ldr., 1967 (Fair)	4150*
544 diesel, 1972 (Fair)	3050*
574 diesel, ldr., 1975 (Good)	5500
674 diesel, 1974 (Good)	3550*
806, 1966 (Fair)	3250
826, 1970 (Good)	6500*

KUBOTA TRACTOR

B-7100, (Good)	2700

MASSEY-FERGUSON TRACTORS

35, 4-cyl. diesel, 1958 (Fair)	1600
35, 1961 (Good)	2100
50, 1960 (Fair)	1800*
65, 1960 (Good)	2000*
65 LP, 1961 (Good)	1825
65, 1961 (Fair)	1690*
65 diesel, 1963 (Good)	2700
135, 1972 (Good)	3750
150 diesel, 1971 (Good)	4300

165 diesel, 1965 (Good)	3200*
165 diesel, 1967 (Good)	3300
175, 1969 (Good)	3150*
240 diesel, 1983 (New)	8500
245 diesel, 1983 (New)	9000*
255 diesel, 1979 (Good)	8500
255 diesel, 1979 (Good)	6400*
265 diesel, 1976 (Good)	6250*
275 diesel, 1977 (Good)	7200
1080 diesel, 1970 (Good)	4200
1085 diesel, cab, 1977 (Good)	8050*

MINNEAPOLIS-MOLINE TRACTORS

RT-100, 1948 (Fair)	250*
Jet Star, 1962 (Good)	2100
G1000 LP, 1967 (Good)	3250

OLIVER TRACTOR

1850 diesel, 1966 (Fair)	2450

JONES FARM EQUIPMENT CO.
Dothan, Alabama
October 11, 1983

ALLIS-CHALMERS TRACTORS

200 diesel, 1973 (Fair)	3600
CA, 1952 (Rough)	350*
G, 1949 (Fair)	735

DAVID BROWN TRACTOR

990 diesel, 1967 (Fair)	750*

MASSEY-FERGUSON TRACTORS

1155 diesel, 1974 (Fair)	3200
1080 diesel, 1970 (Good)	4000*
275 diesel, 1977 (Fair)	5150
275 diesel, 1975 (Fair)	5000
275 diesel, 1975 (Good)	6400*
265 diesel, 1976 (Fair)	4700*
235 diesel, 1975 (Good)	4250
180 diesel, 1967 (Good)	2675*
165 diesel, 1973 (Good)	3900*
165 diesel, 1972 (Good)	3650*
150 diesel, 1967 (Good)	3100*
135 diesel, 1974 (Fair)	2400
135, 1973 (Excellent)	4000*
135 diesel, 1970 (Excellent)	4000
135 diesel, 1968 (Good)	3100*
135, 1968 (Fair)	2600*
135 diesel, 1968 (Good)	2800*
135, 1967 (Excellent)	3400*
135 diesel, 1967 (Good)	3250*
135, 1966 (Rough)	1800*
135 diesel, 1966 (Fair)	2100
65 diesel, 1963 (Good)	2200
65 diesel, 1963 (Good)	2200
65 diesel, 1960 (Fair)	1450
50 diesel, 1964 (Excellent)	2600
40, 1956 (Good)	550
T030, 1953 (Good)	1,250
T030, 1953 (Fair)	875*
T020, 1949 (Good)	875*

FORD-FERGUSON TRACTOR

9N, 1946 (Good)	1400

FORD TRACTORS

8000 diesel, 1977 (Fair)	3500
8000 diesel, 1968 (Rough)	2250*
5000 diesel, 1972 (Good)	4750
5000 diesel, 1968 (Good)	4300
5000 diesel, 1967 (Good)	4600
4000 diesel, 1968 (Good)	3500
4000, 1968 (Fair)	2900*
4000, 1963 (Good)	2100*
4000 diesel, 1963 (Rough)	1400*
4000, 1962 (Rough)	725
3000 diesel, 1977 (Good)	3300*
3000 diesel, 1973 (Excellent)	4000
3000 diesel, 1970 (Good)	3300*
3000 diesel, 1970 (Excellent)	4600
3000 diesel, 1970 (Excellent)	3900
3000 diesel, 1969 (Good)	3750
3000 diesel, 1969 (Excellent)	3900*
3000 diesel, 1969 (Good)	3650
3000 diesel, 1969 (Excellent)	4100*
3000 diesel, 1968 (Fair)	2800
3000, 1968 (Fair)	2550
3000 diesel, 1966 (Fair)	2900
2000 diesel, ldr., 1966 (Fair)	2800
2000, 1964 (Rough)	850*
1000 diesel, 1976 (Good)	3300
Maj. diesel, 1954 (Good)	950
841 diesel, 1958 (Good)	1525
641 diesel, 1959 (Good)	2000
641, 1959 (Excellent)	2500
640, 1956 (Good)	2000
Dexta, 1960 (Good)	825
Dexta, 1959 (Good)	900
8N, 1952 (Good)	1600*
8N, 1952 (Excellent)	2100

INTERNATIONAL HARVESTER TRACTORS

1566 diesel, 1975 (Rough)	2900*
884 diesel, (Excellent)	9500
884 diesel, cab, 4WD, (Good)	7600
784 diesel, cab, 1979 (Excellent)	7100
706 diesel, 1963 (Rough)	1900*
674 diesel, 1976 (Good)	4050
674 diesel, cab, 1976 (Excellent)	5000
606 diesel, 1964 (Fair)	1000
584 diesel, cab, 1979 (Excellent)	6200
584 diesel, cab, 1978 (Excellent)	6850
574 diesel, 1974 (Good)	4100*
574 diesel, 1974 (Good)	3500*
574 diesel, 1973 (Good)	3750*
444 diesel, 1968 (Good)	3300*
424, 1964 (Good)	1600
B414 diesel, 1963 (Good)	1200*
B414 diesel, 1963 (Good)	1250
33 diesel, 1957 (Good)	1275
B275 diesel, 1958 (Good)	1100
230, plow, bld., 1957 (Good)	875*
C, 1948 (Good)	575
Sup. A, 1949 (Good)	1575
A, 1945 (Good)	700*
Cub, Loboy, mo, 1962 (Good)	1700
Cub, Loboy, mo, 1956 (Fair)	1000*
Cub, mo, 1948 (Good)	1225

JOHN DEERE TRACTORS

4840 diesel, cab, duals, 1979 (Excellent)	24,500
4630 diesel, 1973 (Good)	8250*
4520 diesel, 1969 (Rough)	3000*
4440 diesel, 1978 (Good)	15,700
4430 diesel, duals, 1977 (Excellent)	12,200
4430 diesel, 1974 (Good)	10,600
4320 diesel, 1971 (Fair)	4700
4230 diesel, 1974 (Good)	8200
4030 diesel, 1976 (Rough)	3600*
4030 diesel, 1975 (Good)	9500
4020 diesel, cab, 1966 (Rough)	3000
3020 diesel, 1968 (Fair)	3500
3020 diesel, 1967 (Fair)	3500
2840 diesel, 1978 (Excellent)	8900
2640 diesel, 1977 (Excellent)	8300
2630 diesel, 1974 (Good)	5600
2130 diesel, (Good)	3850
2030 diesel, 1974 (Fair)	3100*
2020 diesel, 1969 (Good)	4300*
2020 diesel, 1969 (Good)	4250*
1020 diesel, 1969 (Good)	3350
1020 diesel, 1967 (Excellent)	3800
420, 1958 (Good)	1125
50, 1954 (Fair)	800*

LONG TRACTOR

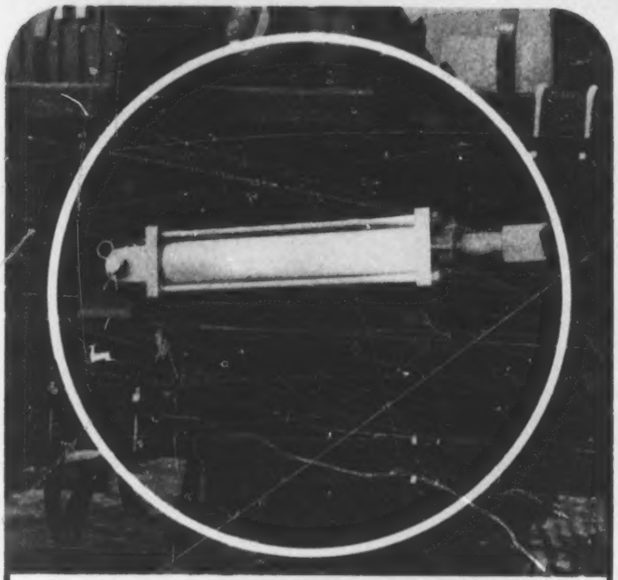
360 diesel, (Good)	3600*

LELAND TRACTOR

4/65 diesel, (Fair)	1200

OLIVER TRACTORS

2-150 diesel, 1975 (Fair)	4250
550 diesel, 1960 (Good)	1950



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Touching the Future Part 2:

ENGINEERING CONCEPTS

Starts on page 10.

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Scott R. Nesbitt, Associate Editor
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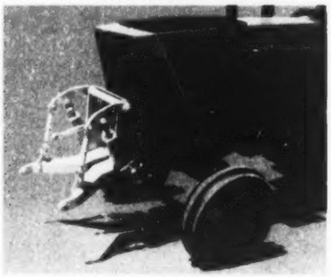
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19th Engineering Concepts Issue
FACING UP TO CHANGE

10: **Introduction; Meet the Experts.**

11: **What the Experts Foresee.** The thoughts of industry and university authorities on some of the top questions of the '80s.

11: **Looking Back for New Ideas.** Sometimes the newest ideas have been around the longest.

18: **Keeping Pace with Changing Farm Size.** Equipment manufacturers face the challenge of deciding how to serve both the big farmer and the increasing number of smaller growers.

22: **Starving in a Gold Mine.** Associate Editor Scott Nesbitt looks at changes some people envision in the service parts business.

24: **The Ag Engineers Winter Meeting.** The annual event ponders future electronics and the world's climate.

36: **At Last, It's Working!** After three years developing his in-house computer system, a dealer offers some how-not-to advice.

38: **Dear Murph**...One of our staffers claims this is a real memo from a real tractor company. You'll have to make up your own mind.

On the cover...A reprise of our December cover, but this time Walt Disney's EPCOT center gleams in daylight, focusing on the futuristic theme carried forward in this issue.

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I&T Update

November Sales: Volume Up on Some Tractor Groups, Down on Others

Tractors under 40 hp and over 140 hp in the two-wheel-drive group and four-wheelers over 200 hp registered substantial gains in retail sales volume, according to the November flash report of the Farm & Industrial Equipment Institute. Other products all showed declines.

By way of comparison, November a year ago was a total bust. Every product category showed substantial declines. Tractors were off 29 per cent from November, 1981; combines were down by half. When 1982 mercifully terminated, tractor sales were down by 26 per cent and combines were down 40 per cent.

Unit Retail Sales

	November			January-November		
	1983	**1982**	**Pct. Change**	**1983**	**1982**	**Pct. Change**
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	2,933	2,128	+37.8	43,606	40,050	+ 8.9
40-99 hp	2,460	2,581	− 4.7	35,476	38,550	− 8.0
100-139 hp	778	1,202	−35.3	13,674	17,366	−21.3
140 hp and over	1,447	848	+70.6	12,693	9,647	+31.6
Total 2-wheel drive	**7,618**	**6,759**	**+12.7**	**105,449**	**105,613**	**− 0.2**
4-wheel drive						
Under 200 hp	142	146	− 2.7	1,840	2,739	−32.8
Over 200 hp	321	241	+33.2	2,789	3,342	−16.5
Total 4-wheel drive	**463**	**387**	**+19.6**	**4,629**	**6,081**	**−23.9**
Total All Tractors	**8,081**	**7,146**	**+13.1**	**110,078**	**111,694**	**− 1.4**
S-P Combines	1,275	1,727	−26.2	11,647	13,947	−16.5
Balers (200-lb. bales)	224	258	−13.2	8,866	8,664	+ 2.3
Forage Harvesters (shear-bar type)	205	375	−45.3	3,944	4,957	−20.4
Mower-Conditioners	301	381	−21.0	13,833	13,527	+ 2.3

Western Assn.'s J. Keith Melvin Is Dead at 65

J. Keith Melvin, who was president and executive director of the Western Retail Implement & Hardware Assn., died Dec. 15 in Kansas City, Mo. He was 65.

Melvin, a graduate of Iowa State U., joined the Western Assn. in its accounting operations in 1947. In 1956, he was named as the group's executive director.

In 1962, he co-founded the Western Farm Show, which became one of the leading indoor agricultural equipment exhibitions in the country. He was co-founder and a past president of the North American Farm Show Council.

Melvin is survived by his wife, Jean, and three children. Funeral services were held Dec. 17.

New Contract: Earley, Hesston Settle Lawsuit

Earley Ford Tractor Co., Cameron, Mo., and Hesston Corp. have issued a joint statement that Earley has agreed to become a "choice products" dealer for Hesston. As part of this contractual arrangement, the Earley lawsuit against Hesston has been dismissed.

Choice products dealerships are a part of Hesston's recently announced marketing plan for all of its dealers. Under it, there are now two categories of dealer: "Prime line" will receive "assistance from Hesston in marketing the complete line of Hesston products" and "choice products" dealers will be able "to participate only in limited programs for specific items in the Hesston line."

Canadian Sales Outlook Is Up For Most Items

Quick digest of Canadian Farm & Industrial Equipment Institute's 1984 outlook, as delivered at the group's annual meeting in November:

Two-wheel-drive tractors under 40 hp—up 12 per cent to 3,400 units; 40-99-hp tractors—up 12 per cent to 8,175; over-100-hp tractors—up 6 per cent to 6,250. Four-wheel-drive tractors—up 9 per cent to 2,500.

Self-propelled combines—up 3.6 per cent to 3,360 units; pull-type combines—up 2.5 per cent to 1,725 units.

Balers (bales under 200 lbs.)—down 4 per cent to 2,160; balers (bales over 200 lbs.)—up 9 per cent to 2,750; mower-conditioners—up 4 per cent to 2,620 units.

Grain drills—up 6 per cent to 6,020 units.

U.S. Farm Equipment Exports Are Hurting

For the first three quarters of 1983, United States exports of farm equipment were down by 22 per cent to $1.519 billion. Most major customers trimmed their purchases; only substantial increases by Saudi Arabia ($245 million, a 150 per cent rise) prevented a more substantial decline.

Our major customer, Canada, cut back imports by 21 per cent to $633 million. Mexico bought 24 per cent less at $28 million. Sales to Venezuela were down by 79 per cent to $11 million. Another major buyer, Australia, cut back 65 per cent, taking $67 million, while South African imports fell 24 per cent to $41 million.

West European buyers of U.S. farm equipment also reduced their activity: United Kingdom, $52 million, down 7 per cent; France, $77 million, down 22 per cent; West Germany, $60 million, off 17 per cent; and Belgium, $40 million, down 29 per cent.

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

ENLOW AUCTION CO.
Tulsa, Okla.
October 22, 1983

ALLIS-CHALMERS TRACTORS

CA, 1953 (Good)	550*
D-14, 1959 (Fair)	1100
185 diesel, 1972 (Good)	6500*

DAVID BROWN TRACTOR

885 diesel, 1969 (Good)	3250

FERGUSON TRACTORS

35, 1957 (Good)	2100
40, 1958 (Rough)	1075

FORD TRACTORS

9N, 1942 (Rough)	725
9N, 1943 (Fair)	975
9N, 1945 (Good)	1200*
9N, 1945 (Good)	1175
9N, 1945 (Fair)	900*
9N, 1946 (Good)	1375*
9N, 1946 (Good)	1400
9N, 1946 (Good)	1475*
8N, 1947 (Rough)	800*
8N, 1948 (Good)	1450
8N, 1948 (Good)	1350*
8N, 1949 (Good)	1520
8N, 1951 (Good)	1375
8N, 1951 (Fair)	900
8N, 1952 (Good)	1580*
8N, 1953 (Good)	1650*
641, 1958 (Good)	2450*
800, 1954 (Fair)	1700*
800, 1955 (Good)	2050
850, 1955 (Good)	2250*
850, ldr., 1956 (Fair)	1750
850, 1956 (Good)	2100
801, 1957 (Good)	2000
851, 1958 (Fair)	1690*
851, 1958 (Good)	2500*
Dexta diesel, 1961 (Fair)	1400*
2000, 1962 (Rough)	1500
2000, backhoe, ldr., 1962 (Fair)	3000
2000 diesel, 1966 (Good)	3300
3000 diesel, 1969 (Good)	3950
3400, ldr., 1966 (Good)	4600
3500, ldr., 1969 (Good)	4900
3600 diesel, 1975 (Good)	6250*
3600 diesel, 1977 (Good)	6500*
4000 diesel, Select-O-Speed, 1968 (Fair)	2250*
5000 diesel, 1965 (Good)	3600
5000 diesel, 1969 (Fair)	3500*
5000 diesel, 1971 (Good)	5200
6000 diesel, 1964 (Good)	1675

CASE TRACTORS

930 diesel, 1961 (Fair)	2500
1090 diesel, cab, 1971 (Good)	6200*
1370 diesel, cab, 1974 (Good)	9500*

MASSEY-FERGUSON TRACTORS

35, 1960 (Good)	2100*
35 diesel, 1961 (Good)	2650
35 diesel, 1961 (Good)	2860
50 diesel, 1958 (Fair)	1850*
50, 1960 (Rough)	1550*
50 diesel, 1962 (Good)	2950
50 diesel, 1963 (Good)	3150
50, 1963 (Good)	2250*
65, 1960 (Fair)	1890*
65, ldr., 1962 (Good)	2650
65, ldr., 1963 (Good)	2300*
165 diesel, 1967 (Fair)	3100*
165 diesel, 1968 (Good)	3625
175, 1969 (Good)	3400*
205, ldr., 1967 (Good)	4450
3165 diesel, ldr., 1968 (Good)	5000
1080 diesel, 1969 (Good)	4250
1080 diesel, 1971 (Good)	4900
255 diesel, 1977 (Good)	6150*
255 diesel, 1978 (Good)	6250
255 diesel, 1978 (Fair)	5500
265 diesel, 1976 (Fair)	5400*
285 diesel, 1976 (Good)	6500
1085 diesel, cab, 1977 (Good)	7500

JOHN DEERE TRACTORS

40, 1954 (Good)	1050*
420, 1957 (Good)	1350*
830 diesel, 1959 (Fair)	850*
3010, 1961 (Rough)	2100
4010, 1961 (Good)	3600
4010 LP, 1963 (Rough)	2500
2830 diesel, 1975 (Good)	5500

KUBOTA TRACTOR

L-285 diesel, 1976 (Good)	2850

INTERNATIONAL HARVESTER TRACTORS

Super-C, 1953 (Good)	1050*
M, 1942 (Fair)	375
M/TA, 1953 (Good)	1750
Cub, mo., 1958 (Good)	1500*
Cub, plow, 1959 (Good)	1150*
W-450, 1956 (Fair)	750*
660, 1960 (Fair)	1100
3444, backhoe, ldr., 1967 (Fair)	4000*
544, 1970 (Good)	4500
674, 1973 (Fair)	2850
674, 1975 (Good)	3850

JONES FARM EQUIPMENT CO.
Dothan, Alabama
November 8, 1983

ALLIS-CHALMERS TRACTORS

7040 diesel, 1976, (Fair)	5100*
B, plow, 1944 (Rough)	325

CASE TRACTORS

1370 diesel, 1975 (Good)	5500*
1175 diesel, 1972 (Fair)	3100*

DAVID BROWN TRACTORS

1200 diesel, 1969 (Good)	2300*
780 diesel, 1969 (Good)	1750*

MASSEY-FERGUSON TRACTORS

2705 diesel, 1979 (Good)	10,200
1105 diesel, 1974 (Good)	4,300
1085 diesel, 1977 (Good)	5950
285 diesel, 1977 (Good)	6100
275 diesel, 1977 (Good)	6900
275 diesel, 1976 (Fair)	5000
265 diesel, 1976 (Fair)	4900*
245 diesel, 1978 (Excellent)	6300*
165 diesel, 1970 (Rough)	2100
165 diesel, 1970 (Excellent)	3700
165 diesel, 1966 (Good)	3000*
165 diesel, 1966 (Good)	3200
165 diesel, 1966 (Fair)	2800*
150 diesel, 1968 (Good)	2900
150 diesel, 1967 (Good)	3450
150 diesel, 1968 (Fair)	2900
135 diesel, ldr., 1973 (Excellent)	4750
135 diesel, 1971 (Excellent)	4350*
135 diesel, 1970 (Good)	3300*
135, 1970 (Good)	3150*
135 diesel, 1970 (Good)	3400*
135 diesel, 1970 (Excellent)	3900
135, 1969 (Good)	3225*
135 diesel, 1969 (Rough)	2000
135 diesel, 1969 (Fair)	2700
135 diesel, 1969 (Fair)	2475
135 diesel, 1969 (Good)	3200*
135, 1968 (Rough)	1700
135 diesel, 1968 (Rough)	1950*
135 diesel, 1968 (Fair)	2700*
135, 1968 (Fair)	2500*
135, 1966 (Good)	3150*
135 diesel, 1966 (Rough)	1900*
35, 1960 (Good)	2200*
35, 1968 (Rough)	1225
35, 1958 (Rough)	1100*
TO30, 1953 (Good)	1400*
TO20, 1952 (Good)	1125
TO20, 1951 (Rough)	650
TO20, 1950 (Good)	1250

FORD TRACTORS

TW30 diesel, 1979 (Good)	18,500*
8600 diesel, 1974 (Rough)	1850
8600 diesel, 1974 (Rough)	2600
8000 diesel, 1969 (Fair)	2900*
6600 diesel, 1976 (Excellent)	7400*
5000 diesel, 1974 (Good)	4000
5000 diesel, 1968 (Fair)	3000*
5000 diesel, 1968 (Fair)	3100
5000 diesel, 1966 (Fair)	3100
5000 diesel, 1966 (Fair)	2950
4000 diesel, 1974 (Fair)	2700
4000 diesel, 1968 (Excellent)	4250
4000, 1968 (Fair)	2900*
4000 diesel, 1966 (Rough)	2500
4000 diesel, 1963 (Fair)	1500
4000 diesel, 1963 (Good)	1950
4000 diesel, 1963 (Fair)	1500
3600 diesel, 1976 (Good)	5350*
3000, 1973 (Good)	3700
3000 diesel, 1973 (Good)	3700*
3000 diesel, 1973 (Good)	3450
3000 diesel, 1973 (Good)	3600*
3000 diesel, 1971 (Good)	3350
3000 diesel, 1970 (Good)	3650*
3000, 1966 (Fair)	2925
2000, 1970 (Good)	3000
2000 diesel, 1963 (Rough)	975
Maj. diesel, 1960 (Fair)	650
Maj. diesel, 1956 (Fair)	750*
Maj. diesel, ldr., 1956 (Rough)	325*
Maj. diesel, 1956 (Fair)	500
Dexta, 1959 (Fair)	1025
821, ldr., 1958 (Fair)	1450
641, 1958 (Excellent)	2300
640, 1955 (Excellent)	2250
Jub., 1953 (Excellent)	2100
8N, 1952 (Good)	1400*
8N, 1952 (Good)	1650
8N, 1951 (Good)	1400
8N, 1951 (Good)	1750
8N, 1950 (Good)	1375
8N, 1950 (Good)	1425
8N, 1950 (Good)	1300*
8N, 1950 (Good)	1400
8N, 1949 (Fair)	1125
8N, (Good)	1350
8N, 1949 (Good)	1250
8N, 1948 (Fair)	1050
8N, 1948 (Rough)	675

INTERNATIONAL HARVESTER TRACTORS

1566 diesel, 1975 (Good)	4400
766 diesel, 1972 (Good)	4400
684 diesel, 1980 (Excellent)	7650
674 diesel, 1976 (Excellent)	4400
656 diesel, 1968 (Rough)	2450
574 diesel, 1974 (Good)	4100*
574 diesel, 1974 (Good)	4000
574 diesel, 1973 (Fair)	3500*
574 diesel, 1973 (Fair)	3400
460, 1959 (Fair)	875
424, 1965 (Good)	1700
424, 1965 (Good)	2050
424 diesel, 1964 (Good)	2050
414, ldr., 1963 (Rough)	950
414, 1963 (Fair)	950
414 diesel, 1963 (Fair)	900
230, plow, mo, 1957 (Fair)	1050*
M, 1942 (Rough)	275*
Sup. A, 1948 (Good)	1010
140, 1960 (Fair)	1150*
A, 1945 (Good)	725*
154, Loboy, mo, 1970 (Fair)	1400
Cub, 1948 (Fair)	750*
Cub, mo, 1948 (Good)	1175

JOHN DEERE TRACTORS

4620 diesel, duals, 1971 (Fair)	5700
4430 diesel, cab, 1976 (Good)	10,750*
4430 diesel, duals, 1975 (Excellent)	11,800*
4430 diesel, 1973 (Fair)	8500*
4430 diesel, 1973 (Fair)	8100*
4320 diesel, 1972 (Excellent)	7000*
4230 diesel, 1974 (Fair)	6200
4230 diesel, 1973 (Excellent)	12,500*
4030 diesel, 1975 (Good)	8400*
4020 diesel, 1966 (Fair)	3750*
4010 diesel, 1962 (Fair)	3200
3020 diesel, 1967 (Fair)	3700
3010 diesel, 1962 (Rough)	1400
2840 diesel, 1979 (Excellent)	9850
2630 diesel, 1975 (Good)	5100*
2040 diesel, 1979 (Excellent)	6600*
2040 diesel, 1979 (Excellent)	6500*
2030 diesel, 1974 (Good)	4100*
2030 diesel, 1974 (Excellent)	4600*
2020 diesel, 1969 (Good)	4100*
2020 diesel, 1966 (Good)	3900*
2010 diesel, 1961 (Good)	1600
1120 diesel, (Good)	2500
1020 diesel, 1972 (Good)	3400*
850 diesel, 1979 (Good)	4800*
830 diesel, 1974 (Good)	3600
50, 1953 (Good)	700

SATOH TRACTOR

Stallion, mo., (Good)	3250

KUBOTA TRACTORS

L245 diesel, mo, 1978 (Good)	2700
L245 diesel, mo, 1978 (Good)	2850

LONG TRACTORS

460 diesel, (Fair)	1600
445 diesel, (Fair)	2250*
384 diesel, (Rough)	1450
360 diesel, (Good)	3000

MINNEAPOLIS-MOLINE TRACTOR

Jet Star, 1961 (Rough)	500

OLIVER TRACTORS

2-105 diesel, 1976 (Good)	7000*
88 diesel, 1954 (Rough)	475

YODER & FREY, INC.
Archbold, Ohio
November 8, 1983

INTERNATIONAL HARVESTER TRACTORS

C, 1948 (Rough)	750*
H, 1949 (Fair)	510
H, 1946 (Fair)	640

H, Idr., 1950 (Fair)	770
H, 1950 (Fair)	590
H, 1949 (Rough)	540
H, 1949 (Fair)	550
M, 1950 (Rough)	650*
M, 1948 (Good)	685
M, 1943 (Good)	525*
M, 1947 (Rough)	600*
Sup. M, 1953 (Rough)	800*
Sup. A, 195[illegible] (Fair)	1475
300, 1956 (Fair)	650*
B, cult., 1947 (Fair)	500*
400, 1957 (Rough)	625
400 diesel, 1958 (Fair)	850
460 diesel, 1959 (Fair)	1650*
504,	950
560, 1960 (Good)	2000
560, 1959 (Rough)	1550
560, 1960 (Fair)	1750
560 Idr., 1961 (Fair)	2200
544 diesel, (Fair)	4000
574, Idr., 1973 (Fair)	5100*
656, 1968 (Good)	4000*
686 diesel, 1978 (Good)	9250
706, 1967 (Rough)	1900
706, 1964 (Rough)	1500
756, 1967 (Rough)	1750
756, 1969 (Good)	3350
806 diesel, 1964 (Fair)	3700*
806, 1965 (Fair)	2900
806 diesel, 1965 (Fair)	4100*
966 diesel, 1975 (Good)	7000*
966 diesel, 1974 (Good)	7000*
1026, 1970 (Fair)	6150
1066 diesel, 1976 (Good)	7100*
1066 diesel, 1975 (Good)	8400*
1066, 1975 (Fair)	7750*
1066, 1973 (Fair)	5300*
1066, 1953 (Fair)	5800*
1086, 1979 (Good)	12,800
1206, 1965 (Fair)	4150
1206 diesel, 1965 (Rough)	5000*
1206 diesel, 1964 (Rough)	3800*
1206, 1965 (Fair)	5000*
1466 diesel, 1976 (Good)	9200*
1466, 1972 (Good)	8900
1568, 1975 (Good)	7700*
1586, 1979 (Good)	8500*
3588, 1980 (Good)	22,250*
5088, (New)	26,000*
4166, 1975 (Rough)	7500*

COCKSHUTT TRACTOR

E-4,	350

ALLIS-CHALMERS TRACTORS

C,	300
WC,	240
WD-45, 1952 (Rough)	575*
WD-45, 1951 (Rough)	500
WD-45, 1952 (Rough)	850
D-12, 1966 (Fair)	1000*
D-14, 1963 (Rough)	900
D-15, Idr., 1967 (Good)	2500
D-19, 1967 (Fair)	1750
D-21 diesel, 1967 (Fair)	3700*
190XT, 1970 (Fair)	2850
7030, 1974 (Good)	7350*
7045, 1982 (Excellent)	16,000
7050, 1975 (Good)	8000*
7050, 1975 (Fair)	6500*
730, 1974 (Good)	7000*

JOHN DEERE TRACTORS

A, 1945 (Rough)	475*
A, 1950 (Good)	600*
MT, cult., 1948 (Fair)	700*
MT, 1950 (Fair)	625*
420 dozer,	1875
520, 1958 (Fair)	1450*
720, 1956 (Rough)	1000*
950 diesel, 1960 (Excellent)	4500*
2010, 1962 (Fair)	1700*
2020 diesel, (Rough)	2500*
2020, (Fair)	3850*
2030 diesel, 1974 (Good)	6000
3010 diesel, 1964 (Fair)	2800
3020, 1968 (Good)	4000
4010 diesel, 1963 (Fair)	4650*
4020 diesel, 1966 (Fair)	6600*
4020 diesel, 1965 (Fair)	4600*
4020, 1965 (Fair)	3300*
4020, 1967 (Fair)	5700
4020, 1966 (Rough)	2850*
4020, 1972 (Good)	7000*
4020, 1977 (Good)	13,500*
4040, 1965 (Rough)	3200*
4030 diesel, 1976 (Fair)	7100*
4430, 1975 (Good)	9950

OLIVER TRACTORS

550, 1962 (Fair)	1850
880 diesel, 1960 (Rough)	1400
1650, 1967 (Rough)	2600*
1850, 1966 (Fair)	3200*
1850, 1966 (Fair)	3400*
1950, 1969 (Fair)	3925
1955, (Good)	5400
2255 diesel, 1974 (Fair)	6750*

CASE TRACTORS

300, 1956 (Rough)	800
500, 1957 (Rough)	900*
430, 1965 (Fair)	1150*
480B, Idr.,	4400
800, Idr., 1964 (Fair)	1330
730, 1965 (Fair)	750*
730 diesel, 1967 (Fair)	2000*
830, 1967 (Fair)	1750*
830 diesel, 1965 (Rough)	1800*
830, (Rough)	750*
830, 1965 (Rough)	975
860, (Fair)	4600*
930 diesel, 1968 (Fair)	1900*
930, 1966 (Fair)	1100
1030 diesel, 1966 (Rough)	2700*
1070 diesel, 1972 (Rough)	3575
1370,	8600
1370, 1976 (Rough)	6900*
1470, (Fair)	8300*
2470, (Fair)	8500*

MINNEAPOLIS-MOLINE TRACTORS

Jet Star, (Fair)	1000*
M-670, 1965 (Fair)	1200
G-900, 1967 (Fair)	2025

DAVID BROWN TRACTORS

1200 diesel, 1972 (Fair)	2700*
1200 diesel, 1975 (Fair)	2750*
990, (Rough)	1800*

FORD TRACTORS

8N, 1943 (Fair)	1050
9N, 1942 (Rough)	875*
9N, 1943 (Fair)	1125
600, 1955 (Fair)	1725
600, 1956 (Good)	2050*
2000 diesel, 1970 (Fair)	3000*
3000 diesel, 1968 (Rough)	2750*
4000, 1970 (Rough)	2850
4000 diesel, 1973 (Good)	4850
5000, 1971 (Fair)	2800*
5000, 1974 (Good)	6150
6000, 1961 (Rough)	1250*
4600 diesel, 1978 (Excellent)	7000
TW-30, 1981 (Good)	21,000*

FERGUSON & MASSEY-FERGUSON TRACTORS

20,	560
20, 1943 (Rough)	680*
30, 1950 (Rough)	950*
50, 1960 (Rough)	1750*
50, (Rough)	1075
135, 1969 (Fair)	3850*
135, 1965 (Fair)	4350
165 diesel, 1970 (Rough)	2750*
165, 1968 (Rough)	2900*
165 diesel, 1970 (Good)	3825*
180, 1969 (Good)	3800*
180 diesel, 1970 (Fair)	2850
1080 diesel, 1971 (Fair)	3400*
1085 diesel, 1977 (Rough)	4750*
1135, 1974 (Rough)	4950

WHITE TRACTORS

4-150, 1975 (Rough)	8000*
1270 diesel, (Fair)	3500*

MASSEY-HARRIS TRACTOR

44 diesel, 1948 (Fair)	475*

world crossroads of agricultural equipment
technological update
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55th
SIMA
International Agricultural Machinery Show
Paris, France
March 4-11, 1984
55th International Agricultural Machinery Show
10th International Exhibition of Mechanized Gardening Equipment

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The business magazine of the farm & industrial equipment industry

February 1984

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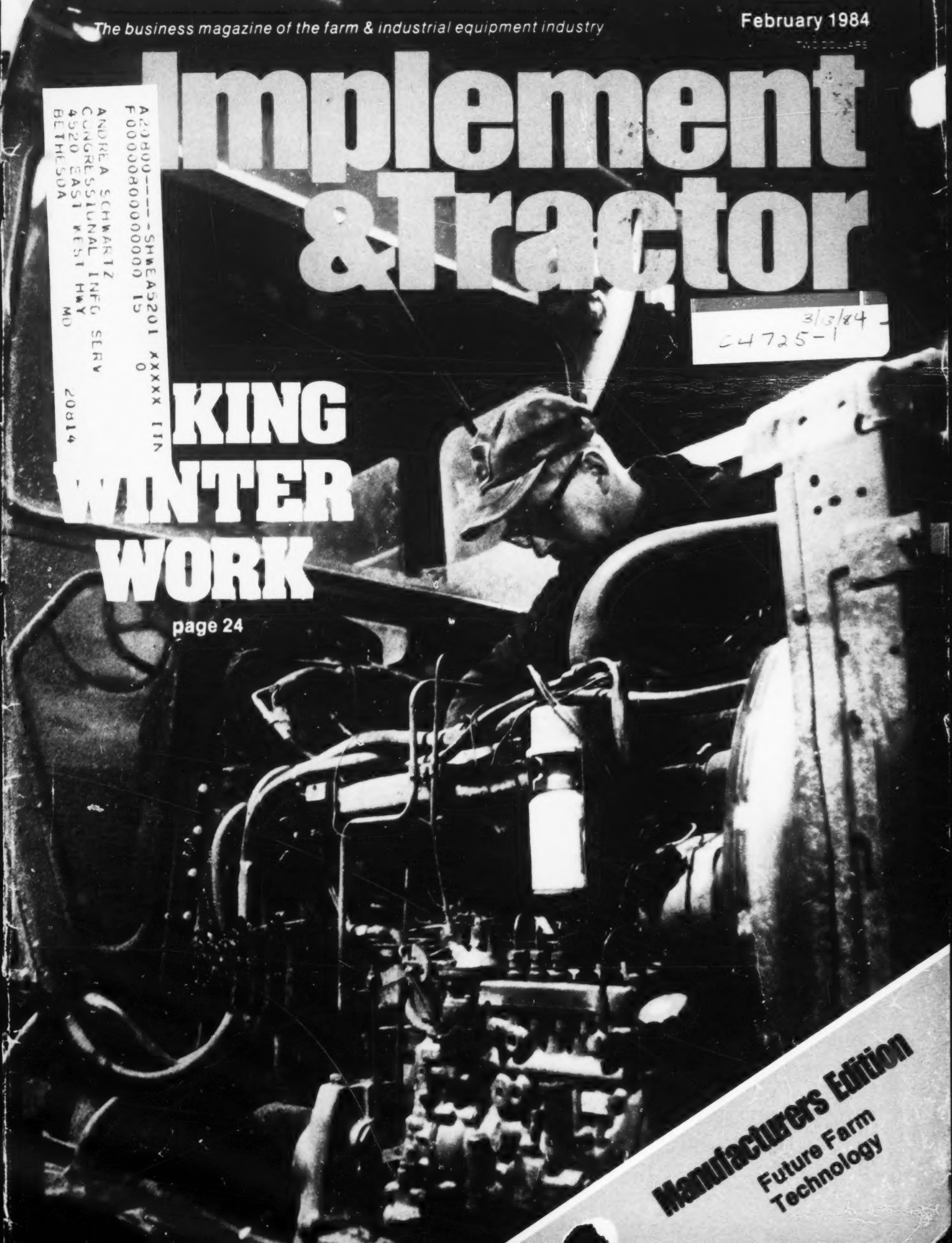

KING WINTER WORK

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Manufacturers Edition

Future Farm Technology

IMPLEMENT & TRACTOR
Editorial, advertising
and circulation correspondence
should be addressed to:
9221 Quivira Rd.
P.O. Box 12901
Overland Park, Kan. 66212
(a suburb of Kansas City, Mo.)
Telephone (913) 888-4664
Telex: 42-4156; Answerback
Intertec OLPK

EDITORIAL
Bill Fogarty, Editor
Scott R. Nesbitt, Managing Editor
Irma Allread, Associate Editor
Kevin Callahan, Art Director
Anita Blattner, Graphic Designer
Pat Blanton, Editor, Product File
Tom Fournier, Editor, Red Book

Contributing Editors:
Frank Buckingham,
Agricultural Engineering
Glenn S. Hensley, Dealer Topics

CIRCULATION
John Arnst, Director
Evelyn Rogers, Manager
Dee Manies, Reader Correspondent

ABP A member of
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ADVERTISING
Ron Wall,
National Sales Manager

Susan Birnbaum,
Marketing Coordinator

Nancy Hupp, Production
(Regional advertising sales offices
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ADMINISTRATION
R. J. Hancock, President
John Wickersham, Publisher

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Implement &Tractor

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8: The Big Forecast of 1984-85. Manufacturers see better unit sales for 1984 in almost all product groups, with strength continuing into 1985.

13: Some New Work for Ex-Dealers. Some thoughts by Scott Nesbitt, I&T managing editor, on using talent that's going to waste.

14: I&T Job Match. A special offer to match talented but unemployed people with jobs that need to be filled.

16: The Southwest Connection. Nearly 6 of 10 dealers are using computers, according to a survey taken in Texas, Oklahoma and New Mexico.

20: Marketing Your Product Support Services. Beware the Maytag Syndrome!

24: Making Winter Work. Good promotion and a little gambling have paid off in lots of winter work for Underwood Equipment.

28: Plugging in to Automotive Technology. Electronic controls for engines, power trains.

39: New Hitch, Tractors, for Deutz in '84. Upgrading the other green line, including a front hitch option.

42: Parts Marketer's Ideas on Countering Competition. Make your customers say "If they don't have it, nobody else will."

44: MF's 3500 Series: Electronic Hitch Control. Three new tractors introduced by Massey-Ferguson.

On the cover... Mechanic Byron Harms tackles an off-season valve adjustment at Underwood Equipment in Ottawa, Kan.

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I&T Update

December's Big Chill Also Bit Into Retail Sales of Farm Equipment

Like the thermometers across the U.S. in the month of December, farm equipment retail sales declined, according to the flash report of the Farm & Industrial Equipment Institute.

The year wound up with minus signs in most product categories. The exceptions were tractors under 40 horsepower and over 140 horsepower, balers and mower-conditioners. Manufacturers had been generally anticipating a substantial sales increase in the fourth quarter that didn't materialize.

Unit Retail Sales

	December			**January-December**		
	1983	**1982**	**Pct. Change**	**1983**	**1982**	**Pct. Change**
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	2,032	1,917	+ 6.0	45,610	41,967	+ 8.7
40-99 hp	2,557	2,584	− 1.0	38,096	41,134	− 7.4
100-139 hp	850	1,345	−36.8	14,494	18,711	−22.5
140 hp and over	935	889	+ 5.2	13,652	10,536	+29.6
Total 2-wheel drive	**6,374**	**6,735**	**− 5.4**	**111,852**	**112,348**	**− 0.4**
4-wheel drive						
Under 200 hp	187	282	−33.7	2,029	3,021	−32.8
Over 200 hp	240	400	−40.0	3,023	3,742	−19.2
Total 4-wheel drive	**427**	**682**	**−37.4**	**5,052**	**6,763**	**−25.3**
Total All Tractors	**6,801**	**7,417**	**− 8.3**	**116,904**	**119,111**	**− 1.9**
S-P Combines	1,210	2,258	−46.4	12,758	16,205	− 21.3
Balers (200-lb. bales)	173	241	−28.2	9,039	8,905	+ 1.5
Forage Harvesters (shear-bar type)	130	188	−30.9	4,074	5,145	−20.8
Mower-Conditioners	427	454	− 5.9	14,261	13,981	+ 2.0

Canadian Retail Sales for 1983 Also Fell Off

In Canada, according to the Canadian Farm & Industrial Equipment Institute, 1983 retail sales of farm tractors over 40 horsepower were down 15 per cent from the prior year at 15,363 units. Other end-of-year data:

Mower-conditioners, down 2 per cent at 2,592; square balers, down 13 per cent at 2,000; round balers, up 1 per cent at 2,421; forage harvesters, down 11 per cent at 700; pull-type combines, down 19 per cent at 1,472; self-propelled combines, down 18 per cent at 2,922; pull-type swathers, down 33 per cent at 2,453; self-propelled swathers, down 24 per cent at 2,419.

Briefly...

Jeffrey H. Flora is new president and treasurer of the Western Retail Implement & Hardware Assn., succeeding J. Keith Melvin who died Dec. 15.

LeRoy F. Barry, who managed the Mid-West Farm Equipment Dealers Assn. for 28 years until its merger with the Iowa Retail Farm Equipment Assn., died Dec. 23, 1983, in Omaha, Neb. For three years after the merger, Barry served as legislative representative for the Iowa-Nebraska Farm Equipment Assn.

The FIEI reports it is monitoring a trend in state legislatures to enact "lemon car" laws, which would require the manufacturer to buy back or replace a new car if a defect that impairs its use, safety or value is not fixed after four or more attempts. FIEI adds that "this trend (is) carrying over to self-propelled farm equipment in Minnesota and Nebraska."

Mitchell I. Quain, C.F.A. for Prudential-Bache, likes the near-term outlook for farm equipment, looking for a 10 to 20 per cent improvement in the industry (but with manufacturers' shipments running less than that). For the long haul, Quain sees the industry as unattractive: "With the farmer no longer replacing labor, this industry should continue to show below-average growth." Stocks mentioned as "attractive": Deere and Steiger.

Direct government payments to farmers in fiscal 1983 came to a near-record $3.898 billion, according to the USDA. In addition, the value of PIK payments is seen at $9.4 billion and the cost of the dairy program $2.5 billion. Farm exports were worth $34.8 billion in fiscal 1983, off 11 per cent from 1982 and 21 per cent from the record $43.8 billion in 1981.

A study of equipment ownership costs by Oklahoma State U. researchers shows that costs of tilling can vary widely by soil types. Average cost per acre for tilling nine clay loam soils was $55.82 while the cost for machinery combinations to till nine variations of sandy loam soils was $40.18 per acre.

Deere's China Sale: $25 Million

The People's Republic of China has awarded contracts to Deere & Co. for approximately $25 million in equipment for a mechanization project. Financing will be provided by the World Bank.

Equipment includes 400 large tractors from Waterloo, 100 combines from Germany, 500 grain drills, 60 planters, 200 cultivators, rippers and spare parts.

Deere also has signed a contract with the PRC to sell it the technology for the manufacture of several farm tractor models. One will be a 150-hp model, the others ranging from 39 to 82 hp.

Most of the 25 million order is due in 1984.

Agro-China '84 Show Is Set

Agro-China '84, billed as a showcase of machinery, equipment, tools, services and technologies for the specific needs of China's agricultural modernization, will be held Nov. 19-24, 1984, at the Foreign Trade Center in Guangzhou (formerly Canton).

The exposition is being organized by AVP Expositions Co. of Hong Kong with the China Guangzhou Scientific and Technical Exchange Center with Foreign Countries. AVP's representative for the Western Hemisphere is Harry C. Lepinske of American Exhibition Services International Inc., Chicago, Ill.

At White Farm: Hays, Peterson Get New Posts

White Farm Equipment Co., Oak Brook, Ill., has named Donald L. Hays, 49, as its vice-president for sales and marketing. John T. Peterson, 32, is new director of marketing operations.

Hays, now responsible for sales of all White products worldwide, succeeds Carl McNair, who recently resigned. Previously, he headed parts sales and distribution operations. Peterson was previously White's director of market development.

Editor's Notebook

(continued)

It's More Pleasant Listening to Each Other, But It's Risky, Too

On the *I&T Update* page, you probably noticed the December flash report from the FIEI on retail sales. For the most part, 1983 was a very forgettable year. Yes, there are some plus signs in that table, but except for the small tractors from Japan, I judge most of them to be (a) indicators that the same month the year before was even worse, or (b) blips that signify some special efforts at inventory unloading.

I think the whole thing would sit better with me if I could forget all the optimistic things that were said in earlier parts of this year by the experts. Also, the optimistic things said by non-experts, certainly including me.

Typical of the sort of things I'm talking about: "Bankers are telling their farmers that now's the best time ever to upgrade their equipment; prices will never be cheaper!" Well, if that's what bankers were telling farmers, the farmers weren't listening.

Maybe instead of listening, they were looking. I suspect that they were looking at vast oceans of new and used equipment on dealers' lots. And since farmers are pretty good at counting, they must have been aware that the equipment glut was continuing. Never a better time to buy?

I do think that farmers were listening to their bankers, but I think the bankers were telling them it was time to use that PIK money to settle up...and avoid getting overextended again on machinery payments.

Another thing we optimists were fond of hearing and saying: "Farmers have just about worn out their equipment. They'll be looking for something to depreciate as 1983 moves along."

But maybe some of that equipment they have is as good and reliable as we've been claiming it is! Maybe farmers decided that since profits weren't going to be so good anyway, and their equipment could still do the job, they could wait to take advantage of investment tax credits some other year.

There I go again, acting like I know what farmers think and do. Actually, I now feel that I don't know a damned thing about this subject. In my case, it's excusable because that's not what I get paid to do.

The real question is, does *anybody* have a real understanding of what farmers are going to do under a given set of circumstances? There are supposed to be research specialists available to this industry who can tell us everything about what farmers feel, think, like, hate, want, dislike, prefer—and intend to do. And indeed, perhaps they're out there doing their job with methods that are right on target.

If they are, maybe the people who should be listening to them, aren't. Sometimes it's easier to listen to the upbeat word, even when that might lead one away from what's realistic and must be considered.

If there are any of these experts out there, will they please contact me and tell me the inside story about what farmers are going to do, given a set of circumstances? Better yet, will they please tell the farm equipment people who need to know in the worst way?

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

YODER & FREY, INC.
Archbold, Ohio
December 13, 1983

INTERNATIONAL HARVESTER TRACTORS

B, 1958 (Rough)	275*
B, cult.,	500
A, 1947 (Rough)	550
Cub, cult., 1951 (Fair)	1000
Cub, cult., 1954 (Rough)	1000
Cub, plow, cult., mo., (Fair)	1400*
Cub, 1953 (Fair)	1475
Cub, 1947 (Rough)	700
Super A, cult., 1952 (Fair)	1550
H, ldr., 1950 (Rough)	575
H, 1951 (Rough)	650
M, 1951 (Rough)	875
M,	1050
M, 1950 (Rough)	500
M, 1950 (Rough)	600*
M, 1950 (Rough)	780
M, 1950 (Rough)	575
M, 1948 (Fair)	775*
M, 1952 (Rough)	810*
M, 1952 (Fair)	750
M, 1950 (Fair)	800
Sup. M, 1953 (Good)	900
Sup. M, 1952 (Fair)	1100
Sup. M, 1950 (Rough)	500
W30,	750
140, 1960 (Fair)	1650
300, 1958 (Good)	1225
300, 1955 (Fair)	800*
300 bld., 1957 (Rough)	1500
400, 1955 (Fair)	925*
400 diesel, 1956 (Rough)	575*
434 diesel, 1967 (Rough)	2175
450, 1957 (Rough)	725*
504, 1965 (Fair)	2050
504, 1966 (Fair)	1900*
560, 1960 (Rough)	1800*
560, 1960 (Rough)	1500*
560, 1960 (Rough)	1350
560 LP, 1961 (Rough)	950*
560, 1961 (Rough)	1550
560, 1960 (Fair)	2000
574, 1973 (Fair)	4250*
660 diesel, 1961 (Rough)	1375
666, 1975 (Good)	3600*
706, 1962 (Rough)	2200*
706, 1964 (Rough)	1800*
706, 1963 (Good)	2250
706, 1964 (Good)	3000
706 diesel, 1966 (Fair)	2900
706 diesel, 1965 (Rough)	2850*
706, 1967 (Fair)	2700*
706, 1965 (Good)	3425
706 diesel, 1964 (Rough)	2800*
706, 1966 (Good)	3050*
806, 1967 (Fair)	3400
806 diesel, 1964 (Rough)	3000*
806 diesel, 1967 (Good)	3400*
806 diesel, 1967 (Good)	4500*
806 diesel, 1966 (Fair)	4150
806, 1963 (Fair)	3000*
806, 1965 (Rough)	2050
806 diesel, 1966 (Rough)	3500*
806 diesel, 1964 (Rough)	4450
806 diesel, 1966 (Fair)	4100*
826 diesel, 1970 (Good)	5900
856 diesel, 1968 (Good)	5800
856, 1968 (Good)	6600
856 diesel, 1970 (Good)	6100*
866 diesel, 1979 (Excellent)	11,450
966, 1976 (Rough)	5825
966, 1974 (Fair)	5400
986, 1979 (Excellent)	12,750*
1066 diesel, 1973 (Fair)	7800
1066, 1973 (Fair)	6300*
1066 diesel, 1976 (Fair)	9000*
1066, 1975 (Fair)	7800
1066, 1975 (Fair)	5800*
1066, 1976 (Good)	5600
1066, 1973 (Fair)	8500*
1086,	12,700
1086,	12,550
1086, 1980 (Good)	12,000*
1206 diesel, 1967 (Fair)	5000*
1206 diesel, 1965 (Good)	5900*
1256 diesel, 1969 (Fair)	5400*
1456, 1967 (Good)	5500*
1456, 1969 (Fair)	5600
1466 diesel, 1974 (Good)	7000
1466 diesel, 1975 (Good)	8250
1466, 1975 (Fair)	7600
1566 diesel, 1974 (Good)	8800*
1586, 1979 (Fair)	10,750*
H-86, 1978 (Good)	7500

CASE TRACTORS

400, 1956 (Rough)	600*
400, 1957 (Rough)	650*
400, 1956 (Fair)	850*
580B, ldr.,	5700
680, hoe & ldr.,	5625
730 diesel, 1967 (Good)	2200*
830 diesel, 1966 (Fair)	1000*
970 diesel, cab, 1971 (Good)	5400*
1030 diesel, 1972 (Rough)	4250*
1030 diesel, 1966 (Rough)	2500*
1270, 1970 (Fair)	7300
1370, 1977 (Fair)	7200*
1370, 1976 (Rough)	6000*
1470, (Rough)	7200*
2090, 1980 (Good)	15,500*
2470 diesel, 1975 (Rough)	8100
2470, (Rough)	8900*

COCKSHUTT TRACTOR

1650 diesel, 1965 (Fair)	2800

DEUTZ TRACTOR

D10006, (Fair)	5000*

JOHN DEERE TRACTORS

A, bid., 1945 (Fair)	525*
A, 1942 (Rough)	675
B, cult., 1947 (Fair)	400*
D,	1800
MT, cult., 1952 (Rough)	775*
310 hoe & ldr.,	11,600
720 diesel, 1957 (Rough)	1050*
60, 1954 (Rough)	850
70, 1954 (Fair)	725*
70 diesel,	450
50, 1954 (Fair)	1150
520, 1958 (Fair)	1225
720,	475

720, 1957 (Rough)	1300*
720 diesel, 1957 (Fair)	1700
720 diesel, 1957 (Fair)	1750
720 diesel, 1958 (Fair)	1550
730, 1958 (Good)	2300*
730, 1958 (Good)	925
730-A, diesel, 1958 (Good)	3150
820 diesel, 1956 (Fair)	2800
950, 1978 (Good)	4800*
1010, 1962 (Rough)	1900*
2010, ldr., 1961 (Rough)	1950
2010, 1960 (Good)	1750
2010, 1963 (Fair)	1850
2010, 1963 (Fair)	1650
2010, 1962 (Rough)	2450
2840, 1978 (Excellent)	8600*
3010, 1962 (Fair)	3250*
3010 diesel, 1963 (Fair)	3950*
3010 diesel, 1961 (Fair)	3250
3020, 1970 (Fair)	4700*
4010 diesel, 1963 (Fair)	4675
4010 diesel, 1962 (Good)	4600
4010, 1963 (Fair)	3050
4010, 1965 (Rough)	3500
4020 diesel, 1965 (Fair)	4925
4020 diesel, 1966 (Good)	6450
4020 diesel, 1967 (Fair)	5900
4020 diesel, 1967 (Fair)	3000
4020, 1964 (Rough)	3400*
4020, 1965 (Good)	6550
4020 diesel, 1965 (Fair)	5050*
4020 diesel, 1967 (Fair)	5950
4020 diesel, 1965 (Good)	6250*
4020 diesel, 1965 (Fair)	5625
4230 diesel, 1976 (Excellent)	12,750
4230, 1974 (Fair)	10,800
4230, 1976 (Fair)	11,500*
4430 diesel, 1975 (Good)	9700*
4430, 1977 (Good)	12,100
4430 diesel, 1976 (Rough)	9000*
4430, 1976 (Fair)	12,000
4620, 1969 (Good)	6000
4620, 1970 (Good)	7100*
4620, 1969 (Rough)	6000*
4630, 1977 (Good)	8800
5020, 1969 (Rough)	5000*
8630, 1976 (Fair)	18,150

ALLIS-CHALMERS TRACTORS

WD diesel	325
WD-45, 1954 (Good)	800
WD-45, 1947 (Rough)	600*
WD-14, 1965 (Rough)	1050*
WD-14, 1963 (Rough)	1400*
D-15, 1964 (Fair)	2200
D-17, 1963 (Fair)	1300*
D-19,	1050
D-19, 1965 (Good)	2200
D-21, 1967 (Rough)	3100*
D-21, 1967 (Fair)	4250*
190XT, 1970 (Good)	5000
200, 1973 (Good)	6225
210, 1971 (Fair)	4800*
7040, 1976 (Good)	7800*
7050, 1974 (Rough)	6325

MASSEY-HARRIS TRACTOR

44 diesel, (Fair)	600

FORD TRACTORS

8N, 1948 (Rough)	900
8N, 1950 (Rough)	1025
8N, 1948 (Rough)	675
8N, 1952 (Fair)	1300
8N, ldr., 1948 (Fair)	1125*
8N, 1951 (Good)	1500*
9N, 1941 (Fair)	625
9N, 1943 (Rough)	990
9N, 1942 (Rough)	890
9N, 1940 (Rough)	525
641, ldr., 1956 (Rough)	1800
806, 1955 (Good)	2450
641, 1956 (Fair)	2100*
800, lcr., 1955 (Rough)	1900*
2000, 1966 (Fair)	2750*
2000 diesel, 1974 (Good)	3000*
2000, 1962 (Rough)	1650*
3000 diesel, 1970 (Fair)	3400
3000, 1969 (Rough)	1850
3000 diesel, 1968 (Fair)	2800*
3000, 1969 (Fair)	3000*
3500, ldr., 1969 (Rough)	3700*
4000 diesel, 1975 (Good)	5225
4000 Select-O-Speed, 1967 (Rough)	1500*
4000 diesel, 1971 (Good)	4550
4000, Select-O-Speed, 1962 (Fair)	1100*
4000, (Rough)	800
4000, 1971 (Fair)	3850
4000, 1971 (Rough)	2250*
5000 diesel, 1975 (Good)	6250
5100 diesel, 1961 (Fair)	850
6000, 1960 (Rough)	850
6000 diesel, (New)	9750*
6000, 1960 (Rough)	1150*
7000 diesel, 1975 (Good)	6800
7000 diesel, 1977 (Good)	7050
8600, 1974 (Excellent)	6600*
9600 diesel, 1974 (Fair)	7000*
4600 diesel, 1980 (Good)	7500*
TW 30, 1981 (Excellent)	21,500*
Jub., 1953 (Fair)	1600*
Jub., 1953 (Rough)	1600

FERGUSON & MASSEY FERGUSON TRACTORS

TE-20, 1950 (Fair)	950
30, 1952 (Fair)	875
30, 1952 (Rough)	1350
30, (Rough)	2225
50, 1960 (Rough)	1600*
65, 1960 (Rough)	1600
65, 1963 (Rough)	1700*
65, 1962 (Rough)	1350
65, 1960 (Good)	2650
165 diesel, 1967 (Fair)	2850*
165, 1969 (Good)	2800*
175, 1970 (Good)	4600*
202, ldr.,	2350
245, 1978 (Fair)	4200*
1135 diesel, (Fair)	6500*
1155, (Rough)	5100*
2805, 1978 (Fair)	9500

WHITE TRACTORS

2-105, 1977 (Fair)	8150
2-135, (Fair)	13,100

OLIVER TRACTORS

1600, 1961 (Fair)	2100*
1650, 1966 (Rough)	1900*
1650 diesel, 1963 (Fair)	3950
1650, 1965 (Fair)	2300
1750, 1966 (Good)	3550*
1750 diesel, 1965 (Fair)	4200*
1800, 1961 (Rough)	2150*
1800, 1961 (Fair)	2100*
1850, 1965 (Fair)	2850
1850 diesel, 1967 (Fair)	4500
1850 diesel, 1965 (Fair)	4250*
1850, 1964 (Fair)	2600*
1855 diesel, 1967 (Good)	6600*

DAVID BROWN TRACTORS

990, 1968 (Good)	2800
990, 1974 (Fair)	1650
1200 diesel, 1972 (Fair)	2800

MINNEAPOLIS-MOLINE TRACTORS

M-302, (Fair)	2000*
M-670, 1967 (Rough)	1125

JONES FARM EQUIPMENT CO.
Dothan, Alabama
December 13, 1983

ALLIS-CHALMERS TRACTORS

7060 diesel, cab, duals, 1976 (Good)	10,750*
WD, 1948 (Rough)	350
CA, 1957 (Rough)	225

CASE TRACTORS

1175 diesel, 1973 (Fair)	3500
1170 diesel, 1970 (Good)	5500
1070 diesel, 1972 (Rough)	2600*
1030 diesel, 1969 (Rough)	3000

DAVID BROWN TRACTORS

990 diesel, 1966 (Fair)	750
950 diesel, (Fair)	1050

MASSEY-FERGUSON TRACTORS

1085 diesel, 1977 (Fair)	4300*
275 diesel, cab, 1976 (Good)	5650
255 diesel, 1976	5750
255 diesel, 1976 (Good)	5450
255 diesel, 1976 (Fair)	4500*
185 diesel, 1972 (Good)	3400
175 diesel, 1973 (Good)	3450*
165 diesel, 1971 (Fair)	2750*
165 diesel, 1968 (Rough)	2450
165 diesel, 1968 (Fair)	3100
165 diesel, 1966 (Fair)	3200*
150 diesel, 1971 (Good)	3500
150 diesel, 1972 (Rough)	2100
135, 1973 (Good)	3375
135 diesel, 1975 (Fair)	2475*
135 diesel, 1975 (Good)	2850*
135, 1971 (Excellent)	3700*
135 diesel, 1967 (Excellent)	3800
135 diesel, 1967 (Good)	3400*
135 diesel, 1967 (Good)	3300
135, 1966 (Good)	3000
135 diesel, (Good)	3100*
135 diesel, 1966 (Fair)	2650
135 diesel, 1966 (Good)	3200*
135 diesel, 1966 (Rough)	1850*
135 diesel, 1966 (Rough)	2250
135 diesel, 1966 (Rough)	2600
35, cab, 1963 (Fair)	1200
35, 1962 (Excellent)	2450
35 diesel, 1962 (Fair)	975
35 diesel, 1958 (Rough)	775
35, 1958 (Good)	2000
35, (Good)	1700
35, (Good)	2000*
T030, (Rough)	600*
T030, (Good)	1550
T030, (Rough)	750*

FORD-FERGUSON TRACTORS

9N, 1946 (Good)	1075
9N, 1946 (Good)	1250

FORD TRACTORS

8700 diesel, cab, duals, 1977 (Excellent)	10,700*
7700 diesel, cab, 1977 (Excellent)	16,000
7000 diesel, 1972 (Good)	4600
6000 diesel, 1962 (Fair)	900*
5000 diesel, 1975 (Excellent)	5350
5000 diesel, 1968 (Good)	3700*
5000 diesel, 1968 (Good)	4100
4000, 1962 (Rough)	975*
3610 diesel, (Excellent)	7100*
3600 diesel, 1976 (Excellent)	4900*
3000 diesel, 1972 (Excellent)	4250*
3000 diesel, 1970 (Excellent)	3800
3000 diesel, 1968 (Excellent)	3950
3000, 1968 (Good)	3200
3000 diesel, 1968 (Good)	3100*
3000 diesel, 1968 (Good)	2800
3000 diesel, 1968 (Good)	2950
3000 diesel, 1966 (Rough)	1750
3000, 1966 (Rough)	2100*
2600 diesel, 1976 (Excellent)	6400
2000 diesel, 1976 (Excellent)	4600*
2000, 1971 (Good)	3260
2000, 1964 (Excellent)	2300
2000, 1963 (Excellent)	2000
1900 diesel, 1979 (Excellent)	4000
1700 diesel, 1979 (Excellent)	4100
Maj. diesel, 1958 (Good)	875
Maj. diesel, 1956 (Fair)	650
950, 1956 (Good)	925
851, 1958 (Good)	2000
850, 1957 (Good)	2150
641, 1960 (Fair)	1075
641, 1959 (Good)	2000
640, 1956 (Good)	1950
Sup. Dexta, 1963 (Fair)	1050
Dexta, 1958 (Fair)	700
Jub., 1953 (Good)	2050
Jub., 1953 (Good)	2000
8N, 1951 (Good)	1150
8N, 1951 (Excellent)	1600*
8N, 1951 (Excellent)	1600
8N, 1950 (Excellent)	1600
8N, 1949 (Good)	1300*
8N, 1949 (Good)	1475
8N, 1949 (Excellent)	1575
8N, 1948 (Fair)	875
8N, 1948 (Good)	1300

INTERNATIONAL HARVESTER TRACTORS

1566 diesel, 1975 (Excellent)	7300
1466 diesel, duals, 1975 (Fair)	4600*
1066 diesel, 1975 (Fair)	5350*
1066 diesel, 1974 (Fair)	4000*
706 diesel, 1964 (Rough)	2275
574 diesel, 1972 (Good)	3550
574 diesel, 1972 (Good)	3500
574 diesel, 1971 (Fair)	2600*
544 diesel, 1968 (Fair)	2700*
B414 diesel, 1963 (Rough)	650
300, 1956 (Fair)	650
B250 diesel, (Fair)	1025
B250 diesel, (Rough)	675
Sup. A, 1950 (Excellent)	1400*
Sup. A, 1948 (Good)	1000
Sup. A, 1948 (Rough)	750
Cub, Lo Boy, 1958 (Rough)	425

JOHN DEERE TRACTORS

6030 diesel, 1974 (Rough)	4000
4840 diesel, cab, 1978 (Excellent)	26,600*
4430 diesel, duals, 1977 (Good)	7700*
4430 diesel, cab, 1975 (Good)	9000
4430 diesel, 1974 (Excellent)	10,900*
4230 diesel, cab, (Excellent)	11,600*
4230 diesel, 1977 (Good)	8400*
4030 diesel, 1975 (Good)	5600
4020 diesel, 1972 (Good)	6750*
4020 diesel, 1968 (Fair)	3450
4020 diesel, 1968 (Good)	4800*
4020 diesel, 1966 (Good)	4650*
3020 diesel, 1968 (Good)	5200
3010 diesel, 1962 (Rough)	900
3010 diesel, 1962 (Good)	2800
2840 diesel, 1978 (Good)	7600*
2640 diesel, 1977 (Excellent)	8300
2630 diesel, 1974 (Good)	6300*
2440 diesel, 1977 (Good)	5900*
2240 diesel, 1976 (Fair)	3300*
2130 diesel, (Good)	4100*
2130 diesel, (Good)	3800*
2010 diesel, 1964 (Fair)	1350
2010 diesel, 1961 (Rough)	750
2010 diesel, 1961 (Fair)	1450*
1120 diesel, (Fair)	2300
1120 diesel, (Fair)	2050*
1020 diesel, 1972 (Good)	3500
1020 diesel, 1972 (Good)	3300
1020 diesel, 1972 (Good)	3400*
1020 diesel, 1971 (Good)	3100*
1010, 1963 (Fair)	850*
850, (Good)	4700
830 diesel, 1975 (Good)	4400
40, 1954 (Good)	1550
40, 1954 (Rough)	625

KUBOTA TRACTORS

245 diesel, (Excellent)	3800
L175 diesel, (Good)	2000*

THE BIG FORECAST

Manufacturers see better unit sales for 1984 in almost all product groups, with strength continuing into 1985.

By Bill Fogarty

■FARM EQUIPMENT manufacturers are believers in 1984. As of the December polling of industry marketing executives by the Farm & Industrial Equipment Institute, the field equipment group (Farm Equipment Div.) sees a 10 per cent increase in retail sales. The Agri-Equipment Div. expects a 7 per cent improvement.

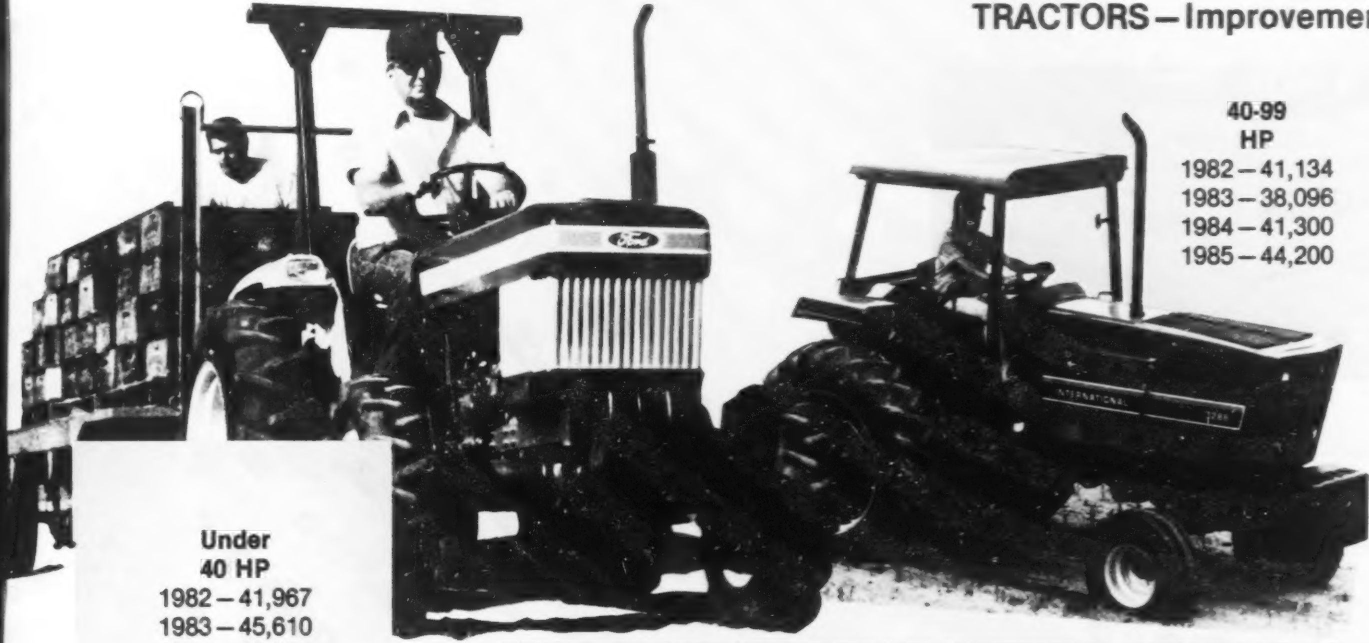
What may be more surprising is that the executives are coming on strong about 1985. A scanning of individual product outlooks shows that most items are expected to sell at a fast clip next year.

The 10 per cent increase seen in field equipment dollar volume is a median figure. There was a range of opinion running from minus 13 to plus 22 per cent change from 1983 sales volume. Only one participant saw a decline in volume and two saw no change. Fifty-one other executives saw increases of 2 to 22 per cent.

The reasons they gave for the improvement in 1983 were the ones that have become familiar among followers of the industry's fortunes. Typical comments:

"Pent-up demand after four years' decline"... "Better farmer financial condition—paid off more debts in '83 with PIK money"... "Better commodity prices, election year"..."Realized net income up"... "No dairy PIK—up only 3 per cent"..."PIK dollars overflowed into 1984"..."Stability in interest rates"..."Old equipment needs replacing"..."Up 22 per cent—changing tillage practices will encourage purchasing"..."Late '84 return to profitable livestock prices"..."Increased acreage, debt paydown in '83, financial community more supportive of equipment purchases..."

TRACTORS—Improvement

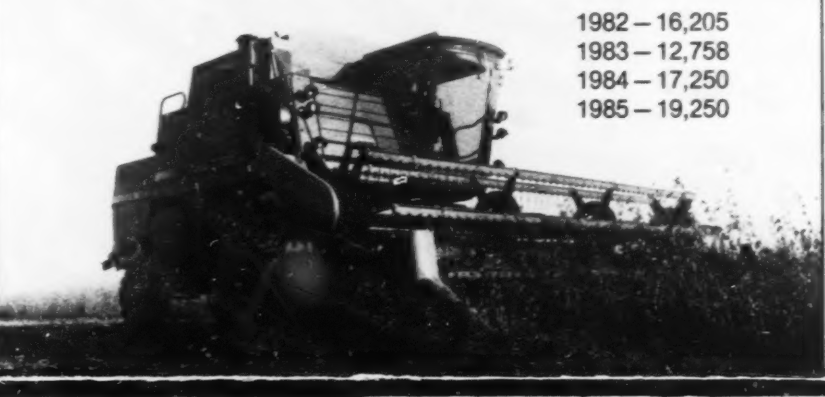


40-99 HP
1982—41,134
1983—38,096
1984—41,300
1985—44,200

Under 40 HP
1982—41,967
1983—45,610
1984—46,300
1985—47,600

COMBINES—Two-year rebound is seen

1982—16,205
1983—12,758
1984—17,250
1985—19,250



OF 1984-1985

How marketers foresee distribution changes

The questionnaire included this open-ender:

"Please comment on major changes you see occurring in marketing and distribution of farm equipment, given the detrimental economic impact on manufacturers and their dealers caused by the prolonged recession."

There were 46 brief essays in response to this. What follows is a synthesis of the most prevalent replies, but also some of the more interesting, too, regardless of prominence:

(More...)

About the State-of-the-Industry Survey

Each December, the Farm & Industrial Equipment Institute circulates a questionnaire among industry marketing executives, asking them to indicate the percentage of unit sales change, up or down, they expect in the coming year. They participate only in terms of the products with which they are involved; their estimates are expected to be oriented toward the total industry rather than their own companies. When the results are computed, a median percentage figure is used for each product or category. This percentage figure has been converted to unit numbers where available. An E after a unit figure, as in tractors under 40 horsepower and round balers, is I&T's estimate.

The State-of-the-Industry outlook is reported at the FIEI Marketing & Management Conference in late January. A second questionnaire is circulated in April and the outlook is updated at the spring meeting of the conference in May.

Jack Snead, vice-president of marketing at Sperry New Holland, served as reporter of the survey when the conference was held Jan. 30-31 at Tucson, Ariz. The next conference is set for May 17-18 at Oconomowoc, Wis.

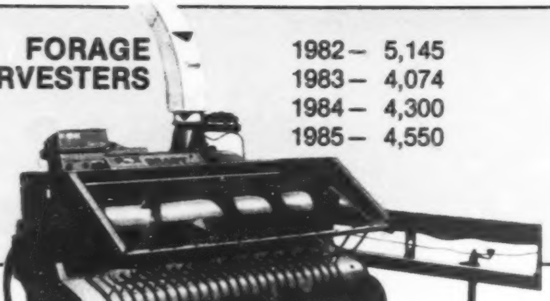
in all categories expected for '84, '85

100 HP and Over
1982 – 29,247
1983 – 28,146
1984 – 31,500
1985 – 33,250

ALLIS-CHALMERS 8070
8850
JOHN DEERE

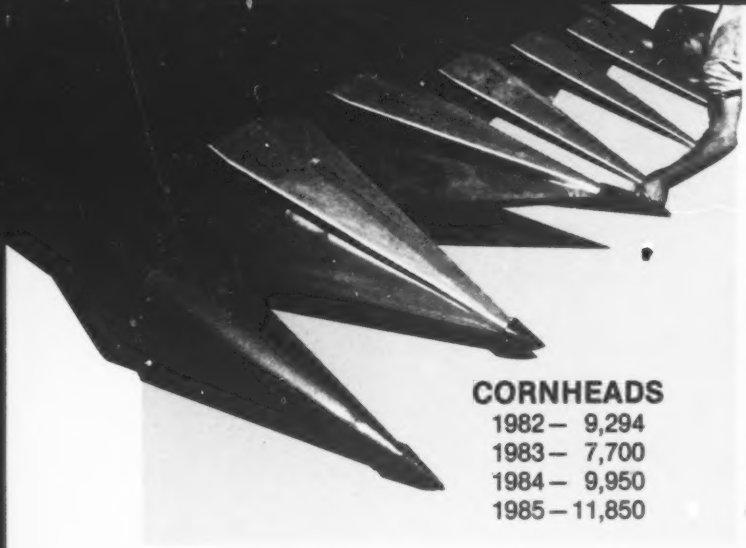
Four-Wheel Drive
1982 – 6,763
1983 – 5,052
1984 – 6,100
1985 – 6,500

FORAGE HARVESTERS
1982 – 5,145
1983 – 4,074
1984 – 4,300
1985 – 4,550



The Forecast

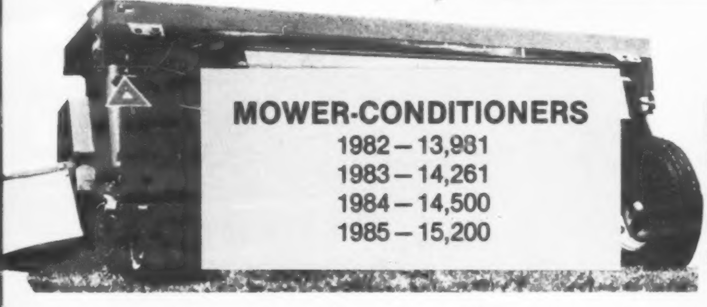
(continued)



CORNHEADS
1982 – 9,294
1983 – 7,700
1984 – 9,950
1985 – 11,850

BALERS
(Bales under 200 lbs.)
1982 – 8,905
1983 – 9,039
1984 – 8,725
1985 – 8,750

WINDROWERS
1982 – 3,474
1983 – 3,213
1984 – 3,450
1985 – 3,550



MOWER-CONDITIONERS
1982 – 13,981
1983 – 14,261
1984 – 14,500
1985 – 15,200

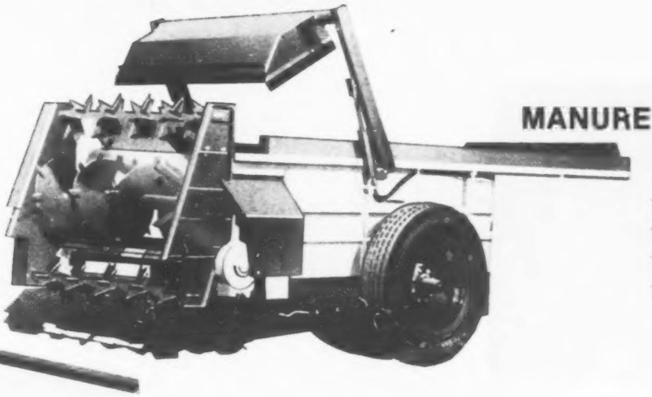
BALERS
(Bales over 200 lbs.)
1982 – 10,900E
1983 – 12,200E
1984 – 13,500
1985 – 14,600

- **"Improved quality** of servicing dealers, closer working relationships with their major and shortline manufacturers and distributors. Increased shortliner role. More 'jobbing out' of accessory products by majors to shortliners of highly price-sensitive products. Shorter terms, more competitive financial investment ratings."
- **"Fewer players,** more dualing at the dealer level (*i.e.,* combined franchising), more caution in stocking at dealer level. Reduction in services offered by many franchisers to dealers."
- **"In an attempt** to sell equipment to a more intelligent user, manufacturers will be making product design changes that are more ergonomical, more state-of-the-art (electronics/computers). However, unless more creative financing is used to give farmers an opportunity to invest in the product, sales will not rise."
- **"Due dates** on equipment will be less flexible. In the past, many dealers who couldn't pay simply extended their credit...."
- **"Continued efforts** at pre-selling equipment, greater conservatism of purchasers, selective selling to key product markets."
- **"Narrower product lines.** Firms keying on areas of expertise and profit potential – geographic and technological. Lower inventory level goals. Centralization of operation and distribution facilities. Standardization of options, manufacturing against orders, longer delivery times to order."
- **"More companies** will by-pass distributors and sell direct to dealers."
- **"Dealers who ceased** operations, voluntarily or not, in the recent recession will not be replaced in many cases. Distribution will remain with franchised dealers but will be serviced more by telemarketing representatives."
- **"Better literature** with more specs, fewer pretty pictures."
- **"There will be** a prolonged period of poor profit margins due to price cutting during the last three years. Watch for increased foreign penetration especially in low technology items."
- **"Dealers will carry** smaller inventories. More lucrative early-order

(More...)

The Forecast

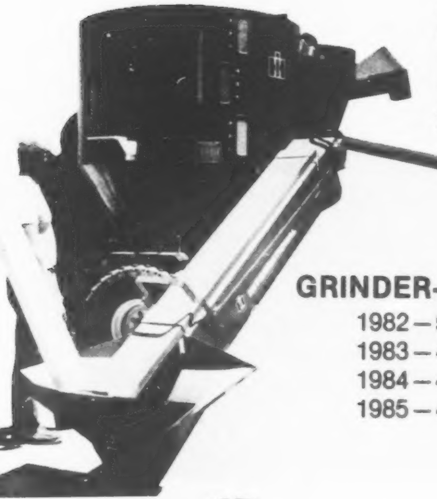
(continued)



MANURE SPREADERS

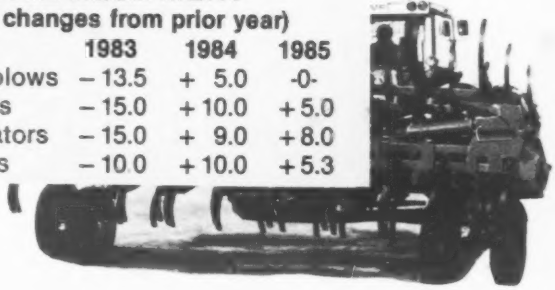
(box type)

1982	11,201
1983	9,520
1984	9,900
1985	10,400



GRINDER-MIXERS

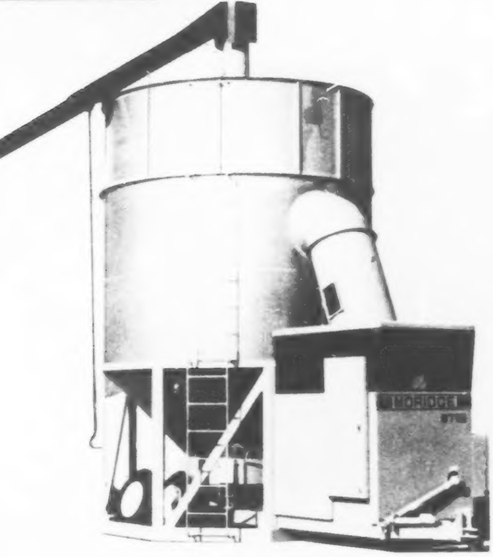
1982	5,167
1983	4,600
1984	4,550
1985	4,800



TILLAGE EQUIPMENT

(per cent changes from prior year)

	1983	1984	1985
Moldboard plows	– 13.5	+ 5.0	-0-
Disk harrows	– 15.0	+ 10.0	+ 5.0
Field cultivators	– 15.0	+ 9.0	+ 8.0
Chisel plows	– 10.0	+ 10.0	+ 5.3



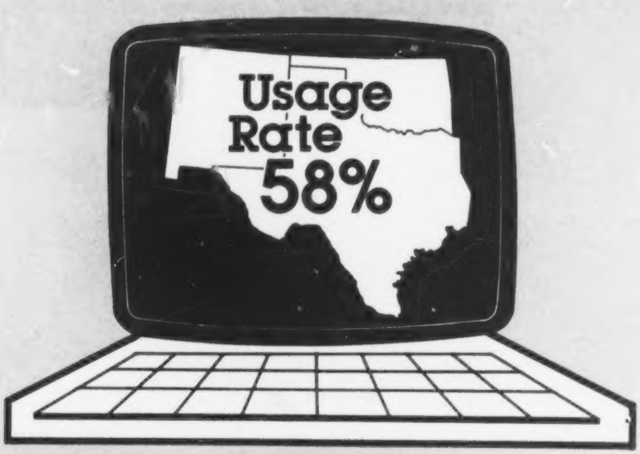
AGRI-EQUIPMENT FORECASTS, 1984, 1985

(Per cent change, retail dollar volume)

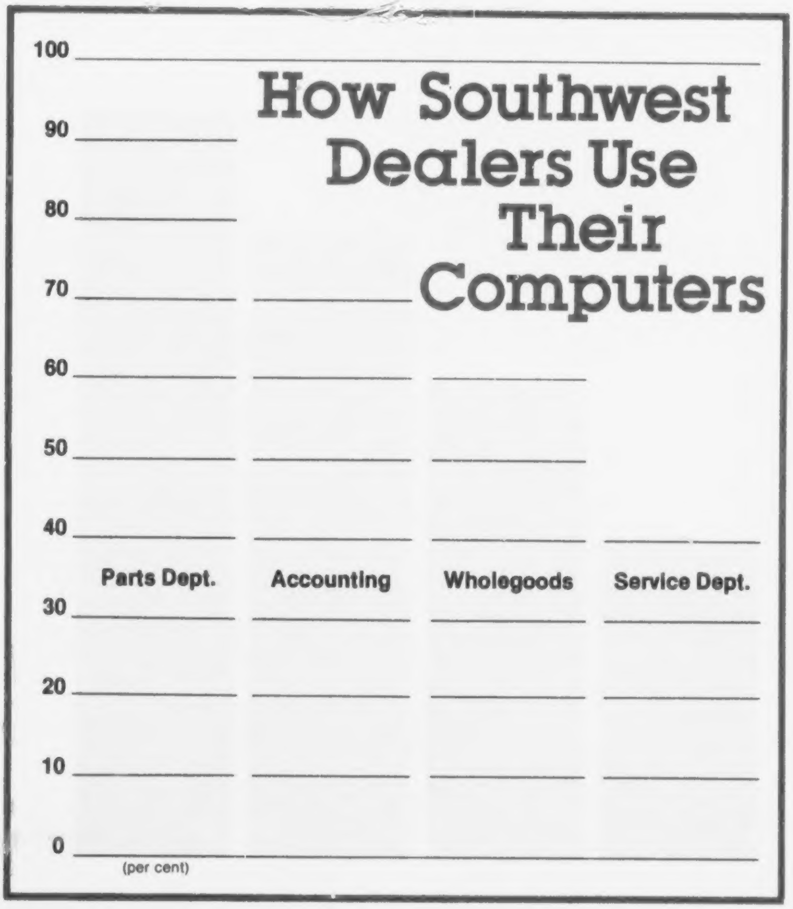
	Pct. Change from Previous Year	
	1984	1985
Augers and elevators	+ 8.0	+ 5.0
Crop dryers, bin type	+ 5.0	+ 6.0
Dryers, batch, continuous flow	+ 15.0	+ 10.0
Dairy and beef equipment	+ 5.0	+ 5.0
Hog equipment	+ 4.0	+ 8.0
Grain bins	+ 5.0	+ 10.0
Chemical application equipment	+ 3.5	+ 5.0
Milking machines	+ 2.5	+ 5.0

programs will be used to get dealers to order and farmers to buy early."

- "**Buy-back laws** being written in most states will create havoc for the next few years, until tested or until the economy improves to where dealers will be able to pay on time."
- "**Price discounting** will decline as a sales tool and quality, reliability and service will be the primary factors influencing consumer purchasing decisions."
- "**Each company** will take a different path based on needs and goods and each will be different from past courses of marketing."
- "**There will be** a restoration of rationality! Floor plan financing that is justified by manufacturing cost decreases will exist. Irresponsible financing will end. Trend will be toward responsible decision-making ....The fat is gone for good!"
- "**The U.S.** is the only country in the world to restrict production. PIK was a disaster for America.... America should match any country in subsidies and move our surpluses (reverse PIK). Japan does a good job of exporting its unemployment. We have the opportunity to do the same with farm crops; we have the ability comparable to Japan's ability to fabricate."
- "**The group** most hurt and least likely to recover is the farm equipment distributor. More manufacturers are going direct to dealers, and in some cases farmers, to keep prices competitive, profits up."
- "**Manufacturers are slowly** acknowledging that equipment sales (units) will not return to the levels of the '70s. As a result, many manufacturers will, over the next few years, have to deal with a severe overcapacity problem. Dealers will continue to consolidate and more emphasis will be placed on satellite stores. Programs (terms) will be difficult to eliminate in the near term. Farmers won't give up any potential program benefits easily." I&T



The Southwest Connection



Nearly 6 of 10 dealers are using computers, according to a survey taken in Texas, Oklahoma and New Mexico.

By Richard A. Edwards
Agribusiness Economist,
Texas Ag Extension Service

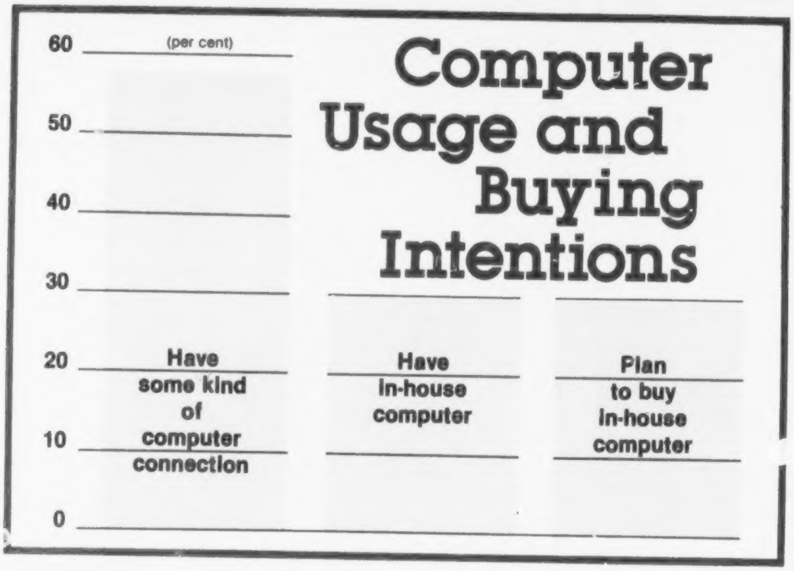
■IMPLEMENT dealers in the Southwest are no exception to the phenomenal growth in computer usage, according to results of a recent survey.

Some 58 per cent of 252 dealers surveyed are using computers in some facet of their business, and the survey predicts increasingly heavy usage in the near future.

Among key trends seen in the research: 30 per cent of responding dealers already have an in-house system and another 30 per cent plan to get one within two years.

Among dealers who aren't using computers, 80 per cent believe they could benefit from them, but the majority of non-users consider the machines too costly.

(More...)



Computer Usage and Buying Intentions

Southwest Connection

(continued)

The survey was conducted in late September and early October, 1983, when about 500 questionnaires were sent to dealers in Texas, Oklahoma and New Mexico.

The dealers were drawn from membership lists of the Southwest Hardware & Implement Assn., and the survey was coordinated through the Agricultural Economics Dept. of Texas A&M U.

While the survey does not show precisely what is happening nationally in dealerships, or indeed in those three states, it is interesting that the Southwest Assn. tends to report figures very close to the national average in the annual Cost of Doing Business study of the National Farm & Power Equipment Dealers Assn.

Specific applications

Among 146 dealers using computers, 94 per cent used the systems to serve their parts departments, with the second greatest usage, 79 per cent, being for accounting. This included maintenance of receivables and payables.

Wholegoods inventory had been computerized by 60 per cent. Service departments were using computers in 41 per cent of the dealerships with some kind of computer link-up.

A question about the type of systems in use indicated that some dealers are tied in to several different computers, reflecting the variety of computerized services available on the market. Here are the linkages:

Connection	per cent
In-house computer	49
Terminal connected to an outside computer	43
Automated parts system with a parts department terminal	27
Accounting service bureau	8
Parts service bureau	8
Payroll service bureau	3

The software to handle these applications was generally of the prepackaged variety, with only 5 per cent of computer users reporting they had developed their own programs, and 8 per cent saying they had revised a purchased software package.

Software was purchased by 39 per cent of the users, and 8 per cent got software from the manufacturer of their particular machine. Another 36 per cent rented or leased their software.

Diversity was also found in acquiring the hardware, with 58 per cent having purchased the system, while 42 per cent used leased equipment.

The most popular brand of hardware was IBM, at 35 per cent, followed by Texas Instruments at 25 per cent. Olivetti took an 8 per cent share, with Pertec and Comtec each having a 4 per cent share. Other brands accounted for 19 per cent of the hardware, with no individual "other" having more than 1 per cent share of the total.

While computers, especially dealer-sized machines, often seem to be an over-night sudden innovation, 18 per cent of the computerized dealers have had a system more than seven years, and 16 per cent have had a system from four to seven years.

Other experience reports: 2 to 4 years, 38 per cent; 1 to 2 years, 18 per cent; 6 months to 1 year, 3 per cent; less than 6 months, 6 per cent.

Would if I could...

Among 106 dealers who didn't have computers in use, 4 out of 5 say their business would benefit from an in-house system, and 69 per cent say they foresee acquiring a computer in the next two years.

Their intended computer applications follow the usage patterns of those who have systems:

Usage	per cent
Parts	81
Accounting	64
Accts. Receivable	56
Accts. Payable	42
Wholegoods	41
General Office	21
Shop	20

Finances figured heavily when the dealers explained the major reasons they did not presently have a computer, with 54 per cent saying the systems were too costly. Other reasons:

	per cent
Present method is adequate	31
No one has actually shown me data on cost, savings	18
Would have to add personnel	10
No satisfactory service representative in my area	6
Present economic situation	5
Waiting on lower cost and better software	5

Next month, we'll take a look at how the sales volume of dealerships has influenced the computer experience of the dealers, and look at some of the expectations of dealers who say they're in the market for a system. I&T

News Briefs

Sperry Completes Sale Of Fluid Power Operation

With acceptance of $213 million in cash and $52 million in notes, Sperry Corp. on Jan. 1 announced closing of the sale of its fluid power operations to Libbey-Owens-Ford Co.

Vickers, a major hydraulic product supplier to agricultural and industrial markets, reported $413 million in sales in the fiscal year ended March 31, 1983. LOF also owns another major hydraulic producer, Aeroquip Corp., which it acquired in 1968.

Glencoe Receives Top British Award

The Silver Award of Merit has been presented to the Glencoe Soil Saver conservation tillage tool at the Royal Smithfield show sponsored by the Royal Agricultural Society of England.

The award, the highest honor conferred at the big annual event, will be formally awarded next July at the Royal Show of Stoneleigh. The Soil Saver was introduced in 1969, one of the first conservation tillage tools offered in North America.

New Holland's O'Brien Is Dead at 56

Paul A. O'Brien, Jr., who was Sperry New Holland's vice-president and general manager of Latin American and Far East manufacturing and marketing, died unexpectedly of a heart attack Dec. 31 at Lancaster, Pa.

With Sperry New Holland for 33 years, his assignments included international marketing manager; director of the company's Brussels, Belgium, marketing center; European Div. marketing director; communications and promotions director; director of sales; and vice-president for marketing and public affairs, worldwide.

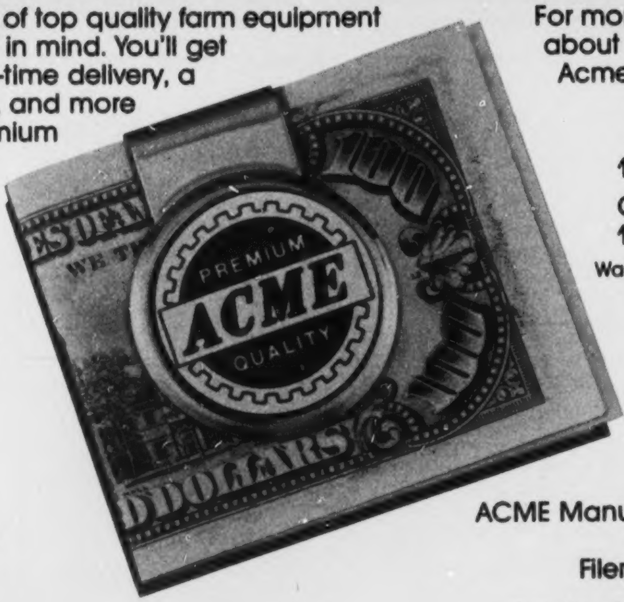
He is survived by his wife, Florence, and four children.

W. German Tractor Sales Up Despite Slower 2nd Half

Sales of farm tractors in West Germany were about 10 per cent higher in 1983 than in 1982, moving up from 41,380 to 45,567 units. The second half of 1983, however, produced less volume than the same period in 1982—17,651 units sold compared with 20,033.

Here's how market shares worked out in 1983 for six major tractor firms:

Company	1983 Units	1983 Pct.	1982 Pct.
Deutz	8,710	19.1	18.9
Fendt	8,072	17.2	18.9
Int.. Harv.	7,761	17.0	17.0
Deere	4,003	8.8	8.9
Daimler-Benz	3,526	7.7	6.4
Massey-Ferg.	2,444	5.4	5.8
		75.2	76.8



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MARKETING YOUR PRODUCT SUPPORT SERVICES

(The author, president of After Market Services Co., Tulsa, Okla., trains and consults with manufacturers and dealers on parts and service marketing in several capital goods industries.)

By John R. Walker

As wholegoods sales have declined, parts and service profits have become more important for dealer survival. (Beware the Maytag syndrome!)

■IN RECENT YEARS, we've all seen many columns and articles in I&T concerning the importance of parts and service to the equipment dealer's survival. And too many dealers have read these articles, nodded their heads in agreement—and continued business as usual.

Implement dealers have followed the pattern set many years ago by the automotive dealer. It appears to be an ingrained philosophy with many of them that all that's needed is to *sell that iron.* The parts and service sales that follow from this will automatically be the dealer's. There are many among the manufacturers' ranks who share this ingrained philosophy, too.

I see these people as being afflicted with *the Maytag syndrome.* (You've seen that guy on TV, haven't you? He's the lonely Maytag man, sitting in his rocker by the phone, waiting for someone to call.) I suggest that any dealer who waits for the customer to initiate contact on parts and service must be prepared to see more and more of his aftermarket business going to his competitors.

Your customers have a choice in today's competitive product support aftermarket. Once the after-sale warranty period has passed, they are going to be cultivated by professionals in parts and service marketing. These professional marketers began attacking the automobile industry years ago, and today they have left the auto dealer with an average 15 per cent of the parts and service aftermarket.

And today, they are hard after the farm equipment market.

What's the answer?

The first step to resolving this problem has to be one taken by the dealer himself. He has to become as seriously involved with the management of his parts department and his service operation as he is with wholegoods sales. He must recognize that parts and service must be run as profit centers, that customers have a *choice* about where they go for parts and service, and that there is likely more competition for his product and support business than there is for wholegoods.

You may be turning a profit in your parts and service operations, but if your total sales volume has been declining, then you need to turn your efforts to marketing your product support services.

Actually, a look at the National Farm & Power Equipment Dealers Assn. Cost of Doing Business study indicates that parts operations have assumed a greater portion of the average farm equipment dealership's volume and a good deal more dollars. But parts department gross margin has gone up only marginally in the past five years and expenses have risen sharply.

And the average annual parts turnover, as shown by the CDB study, is going down, down, down.

When we refer to marketing your product support services, we're talking about the total effort, and selling is just a part of it. The dealership that doesn't develop its product support abilities in the 'eighties and then learn to market those abilities is not likely to survive.

So what's the answer? It's a matter of returning to the basics:

1. **Know your market.**
2. **Know your competition.**
3. **Do your market planning.**

Knowing the market

The area in which manufacturers and dealers are most vulnerable is determining their market for parts and service sales. Without first knowing the potential of the market, it isn't possible to plan efficiently for setting inventory levels, to determine how much to invest in facilities, to know how many people to hire and how much training to commit to, or how much to budget for advertising and promotion.

Surveys of the industry indicate that dealers are achieving approximately 80 per cent of their product support sales from only 20 per cent of their customers. Yet most dealers are hard-pressed to identify their customer base that provides them with the 80 per cent. Knowing your market calls for a customer analysis.

There are many ways to conduct a customer analysis. The job need not be elaborate. Remember that you are attempting to determine who is using your services and who is not. After you have done this analysis, you can begin to determine the *whys* and what is required to achieve more penetration.

As an over-simplified example, if a dealer's analysis shows the potential parts and service business is $4 million and he is doing $1 million, that dealer is looking at a 25 per cent penetration. It is at this point the importance of market planning and goal setting in product support sales becomes evident.

Know your competition

Since you're in a genuine competitive war for survival, you need to know fully who your competitor is. How well do you know his techniques of battle—the means by which he brings that customer to his place instead of yours?

Obviously, the larger your market area and its nearness to metropolitan areas, the greater your competition. But wherever you are, you must get rid of assumptions about your competition. You need to establish facts about the competition such as who they are, what their true pricing structure is, their marketing philosophy, the quality of their parts or service, and their integrity or reputation.

Some of the ways of going about this include looking in your Yellow Pages to see who is advertising parts. But don't stop at the farm equipment or tractor listings. Take a look under automobile parts, phone some of the chain stores and see if they have a filter or a belt that will fit one of your Ford or Deere or IH or White tractors.

Do some comparison shopping. Find out how your competition is using point-of-purchase merchandising. See how a customer is treated.

Ask your customers if they do some business with those other parts outlets, and why. And in every case, deal with the facts.

Market planning

Market planning is, for many dealers, nothing more than projecting a dollar figure beyond what was done the previous year. There is seldom direction or planning as to how this figure is to be achieved.

But once you know your market and your competition, you can put your parts and service marketing plan into writing. Look at your plan as a road map that tells you where you are, where you want to go and how to get there.

You must, of course, involve your parts and service managers in this planning, for they will be asked to achieve definite goals. Parts managers can no longer be just

(Continued on page 41)

Parts department performance review—How are dealers doing?

While Johnny Walker talks in the accompanying article about the first steps a dealership must take to get up to a competitive level in the aftermarket, I&T presents this brief review of parts-related data from the National Farm & Power Equipment Dealers Assn. Cost of Doing Business study. We covered the five most recent years for which information is available—1978 through 1982. In one area, parts turnover, we went back nine years to show what has happened through most of a decade. Results of NFPEDA's 1983 study will be available from dealer associations in a few months.

Parts Turnover: Down Almost a Full Turn

Year	Times Inventory Turned
1974	2.41
1975	2.28
1976	2.24
1977	2.02
1978	2.05
1979	2.01
1980	1.84
1981*	1.54
1982*	1.54

*Agricultural dealers only

Parts Dept. Sales
(Dollars, and as a per cent of total sales)

1978	$300,151	16.04%
1979	365,105	15.56
1980	395,027	17.54
1981*	450,017	18.13
1982*	457,045	20.87

Parts Department Gross Margins

1978	29.13
1979	28.62
1980	30.80
1981*	30.68
1982*	31.29

Parts Inventory
(Dollar value, and as a per cent of total assets

1978	$103,669	11.57%
1979	129,782	11.72
1980	148,501	11.99
1981*	167,351	11.37
1982*	170,675	11.36

Sales Performance per Man

	Average Number of Partsmen	Average Total Parts Department Salaries	Average Salary per Partsman	Average Parts Sales per Partsman
1978	2.03	$21,295	$10,500	$147,858
1979	2.17	26,670	12,300	168,251
1980	2.16	28,683	13,300	182,883
1981*	2.14	32,103	15,000	210,289
1982*	1.97	31,757	16,100	186,693

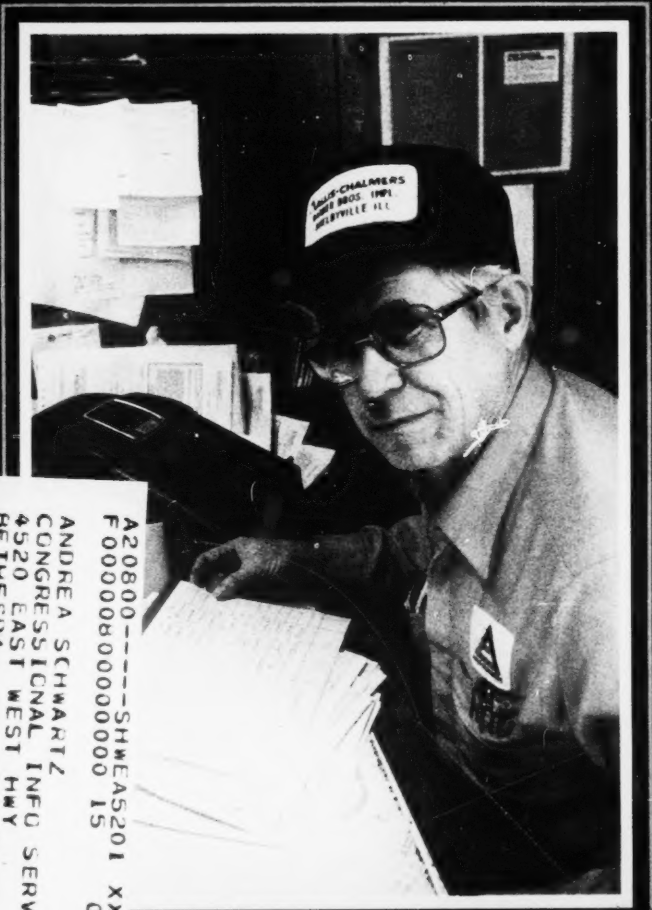
*Agricultural dealers only

The business magazine of the farm & industrial equipment industry

March 1984
TWO DOLLARS

Implement & Tractor

C4725-1 4/2/84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PSST! DON'T TELL KEN BARKER HOW BAD BUSINESS IS. HE'S TOO BUSY SELLING!

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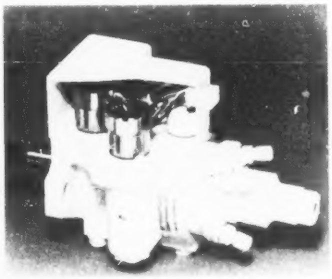

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10: You Just Can't Wait! This Illinois dealership picked a product they thought their farmers were ready for—then hit the road and showed it to them.

14: The Language Gap in Computer Sales. Some thoughts by Managing Editor Scott Nesbitt on why more dealers don't own computers.

16: Marketing & Management Conference. The FIEI goes to Tucson for a semi-annual round of selling products and running businesses.

20: Many Dealers Ready to Buy Computers. The second part of a survey of Southwest dealers looks at non-computerized dealerships.

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On the Cover...Ken Barker of Shelbyville, Ill., adds up sales that came from demonstrating, not waiting.

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Editorial, advertising
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9221 Quivira Rd.
P.O. Box 12901
Overland Park, Kan. 66212
(a suburb of Kansas City, Mo.)
Telephone (913) 888-4664
Telex: 42-4156; Answerback
Intertec OLPK

EDITORIAL
Bill Fogarty, Editor
Scott R. Nesbitt, Managing Editor
Irma Allread, Associate Editor
Kevin Callahan, Art Director
Anita Blattner, Graphic Designer
Pat Blanton, Editor, Product File
Tom Fournier, Editor, Red Book

Contributing Editors:
Frank Buckingham,
Agricultural Engineering
Glenn S. Hensley, Dealer Topics

CIRCULATION
John Arnst, Director
Evelyn Rogers, Manager
Dee Manies, Reader Correspondent

ABP **A member of American Business Press**

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ADVERTISING
Ron Wall,
National Sales Manager

Susan Birnbaum,
Marketing Coordinator

Nancy Hupp, Production
(Regional advertising sales offices
listed on ad index page.)

ADMINISTRATION
R. J. Hancock, President
John Wickersham, Publisher

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INTERTEC PUBLISHING CORP.

I&T Update

January: Tractors Hold Even; Other Items Take a Drop

The year started out with upward performances by tractors under 100 horsepower and two-wheelers over 140 horsepower, offset by a big falling off of tractors in the 100-140 bracket and four-wheelers. The net result: Total unit sales were up one per cent.

Combines tumbled off of the performance of a year earlier, but January of 1983 produced some unusual bulges in sales, possibly reflecting some late reports on business from December, 1982.

(Source: Farm & Industrial Equipment Institute's monthly flash report.)

	Unit Retail Sales		
	January 1984	January 1983	Pct. Change
Farm Wheel Tractors:			
2-wheel drive			
Under 40 hp	2,122	2,068	+ 2.6
40-99 hp	3,078	2,590	+18.8
100-139 hp	744	1,419	−47.6
Over 140 hp	1,212	926	+30.9
Total 2-wheel drive	**7,156**	**7,003**	**+ 2.2**
4-wheel drive			
Under 200 hp	122	186	−34.4
Over 200 hp	188	205	− 8.3
Total 4-wheel drive	**310**	**391**	**−20.7**
Total All Tractors	**7,466**	**7,394**	**+ 1.0**
S-P Combines	1,086	1,796	−39.5
Balers (200-lb. bales)	278	391	−28.9
Forage Harvesters (shear-bar type)	118	171	−31.0
Mower-Conditioners	450	563	−20.1

Hesston Reports 1983 Net Profit Of $2 Million

Hesston Corp. returned to profitability in 1983 with a net of $2.03 million on sales of $197.9 million. In 1982, sales had been $202.1 million, with a net loss of $4.24 million (excluding the results of its French subsidiary, Hesston S.A., which was sold in 1982 to Laverda S.A., another Fiat subsidiary. The 1982 loss including the French subsidiary was $7.95 million on sales of $254 million).

The fourth quarter of 1983 produced, as anticipated, a loss of $2.67 million because of low shipments to dealers. Sales were $42.5 million. In the last period of 1982, sales were $35.8 million and the loss was $2.23 million, excluding French business.

Howard Brenneman, Hesston, president, said that Hesston has been concentrating on developing dealers to handle its full line of products, including tractors, and that approximately half of Hesston's 1,200 dealers "have now converted to a full-line franchise" with the company.

Brenneman cited Hesston's Woods Div., Oregon, Ill., as the company's "star performer," with sales and profit increases. Fred Scharer, Woods Div. general manager, has been appointed a vice-president of Hesston.

Briefly...

Securities analysts at Prudential-Bache, New York, took a look at January FIEI retail sales numbers and delivered an unenthusiastic bulletin to investors. **Deere** and **Allis-Chalmers** are rated as being average performers for up to the next 18 months. **Steiger** shares are considered worth buying in the next six months, with average performance expected in the following 12 months. **International Harvester** shares, suggest analysts Mitchell Quain and Catherine Lynch, should be traded for other shares over the next 18 months.

Farm Tractor Imports Went Up Sharply in 1983

Tractor imports took a strong jump in 1983 compared with 1982. The dollar volume was up 24 per cent to $628 million. Unit numbers went up from 73,295 to 104,106. Imports of tractors under 40 horsepower, mostly from Japan, went up from 39,764 to 47,289, just a few thousand over actual retail sales for the year (45,610).

The big surge was in imports of 40-79 horsepower units—up from 15,858 worth $135.5 million to 34,085 valued at $227.1 million. The 10,570 units of this horsepower group that came in from West Germany more than doubled the 4,016 that were imported in 1982. (Main imports from West Germany are John Deere and Deutz.)

The British tractor industry also shipped a much higher quantity of 40-79 hp tractors to the U.S. last year—13,502 compared with 3,195 in 1982. (Fords, MFs, IHs and Cases come from the U.K.)

Used. In the 1950s and 1960s, used tractors were imported to the U.S., mostly from Canada and Britain, in substantial quantities. British units, usually late models with few hours, could be priced very competitively because of U.K. depreciation rules. Mandatory cabs may have pushed up freight bills, and multinational manufacturers may have altered pricing structures; U.K. quantities declined.

Last year, 3,548 used tractors entered the U.S., 1,862 from Canada and 1,409 from Britain. British imports were up 73 per cent. Possible causes: Sales of new units went up in Britain last year, increasing the quantity of trade-ins. The British pound declined substantially against the dollar, making prices more attractive.

Potential newcomers. Sometimes a small quantity of tractors is imported to the U.S. for test and evaluation, indicating the possible arrival later of a new brand. Examples: 14 Korean units, 20 to 29 hp, came in valued at an average $5,300; 12 from Brazil, 30 to 79 hp; 3 from Finland, possibly Volvo-Valmets; 1 from Switzerland, possibly a Hurliman.

Tractor parts. Farm tractor parts imports rose 11 per cent to $203 million in 1983. The 1982 parts volume of $183 million had been a 38 per cent drop from 1981. The big quantities of parts came from Italy ($51 million), West Germany ($38 million), Britain ($30 million) and Belgium ($21 million).

Total imports. Total volume of farm equipment imports was $1.347 billion, a 14 per cent increase. In 1982, the volume of $1.18 billion was down by 24 per cent from 1981.

7 Nations to Show Wares at Agri-tech, More are Expected

Agri-tech is a popular but apparently uncopyrighted word. It's the name given to a biennial show in Israel (reported in this issue) and now it's also the name of a major, world-class farm equipment trade show set for Sept. 12-15 at Louisville, Ky.

Agri-tech International '84, which has been endorsed by the National Farm & Power Equipment Dealers Assn., announced last month that seven national pavilions are firmly set for the event. Equipment manufacturers from Australia, Denmark, East Germany, Israel, the Netherlands, Sweden and the United Kingdom will display in groups.

According to Stephan Phelps of the Kentucky Fair & Exposition Center, site of Agri-tech, France, Italy and Spain are also currently negotiating for national pavilions at which their farm equipment manufacturers can exhibit.

Other nations will also be represented, said Phelps, by individual displays by manufacturers and suppliers.

According to Phelps, a balance of domestic and overseas exhibitors is being sought. J I Case is listed by Agri-tech as the first of the U.S. major manufacturers to contract for space. At press time, another was reported ready to sign.

At the request of Agri-tech management, *Implement & Tractor* has agreed to produce a series of two seminars as part of the show.

The Southwest Connection:

Survey finds many dealers ready to buy computers

By Richard A. Edwards Agribusiness Economist, Texas Ag Extension Service

■THE BIGGER YOU are, the harder you fall for computers.

That's one message that comes out of a survey conducted last fall among tractor and implement dealers in Texas, Oklahoma and New Mexico.

Our report last month noted that in-house computers were already owned by 30 per cent of the 252 dealers who responded to the survey.

A closer look at those ownership figures showed that 100 per cent of dealers with annual sales over $5 million were using computer services, and 73 per cent of those big dealers had in-house computers.

As the accompanying chart shows, computer use and ownership both decline as sales volume gets smaller, to the point where only 5 per cent of small dealers, under $500,000 annual sales, owned an in-house computer.

This does not imply that big dealers got that way because they have a computer.

Rather, analysis of several survey questions supports the notion that most dealers can see the benefits of using electronic data processing, but are holding off because of financial considerations.

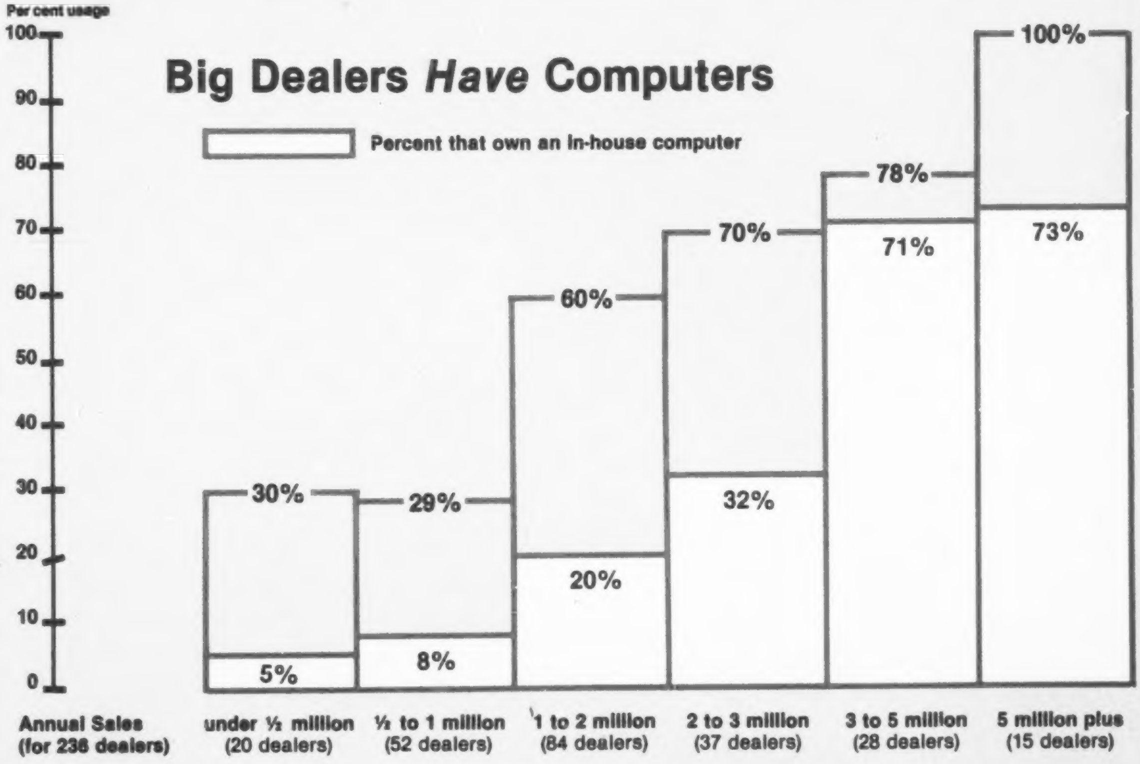
About 40 per cent of the responding dealers said they did not currently have a computer, but 80 per cent of these non-users feel they would benefit from having an in-house system.

Asked to rank their priorities for computerizing various departments in their businesses, these non-users selected the same applications as those dealers who already have computers. In order, these priorities are:

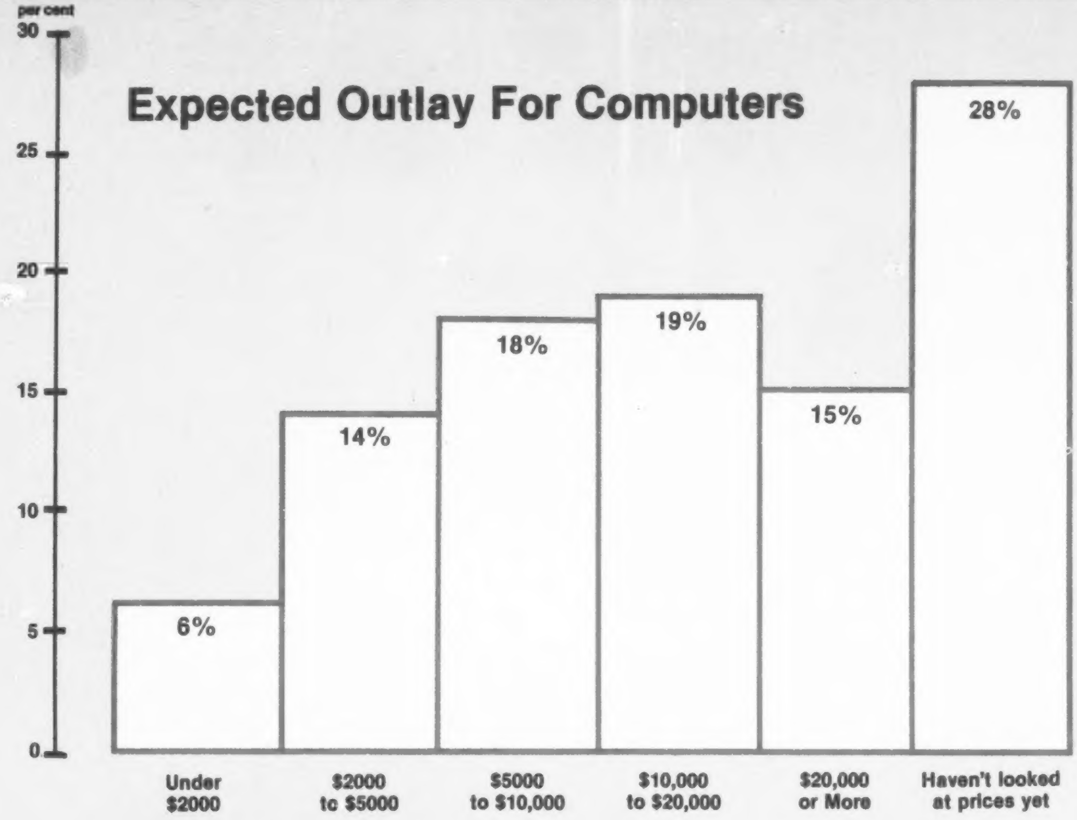
Parts Inventory
Accounting
Accounts Receivable
Accounts Payable
Whole Goods Inventory
General Office
Service Shop

The survey found that 69 per cent of non-computerized dealers feel they will have an in-house computer within two years. This, taken with other survey findings, indicates that dealers generally have positive feel-

(More...)



Comparison of annual sales volume with computer use, for 236 dealers who gave their sales figures in survey.



Question: What investment do you foresee making for a computer system, including installation and software? Responses from 106 dealers who are not connected to a computer.

Southwest Connection

(continued)

ings about the benefits of computers as a management tool.

Then why aren't 100 per cent of dealers currently tied into computers, using either an outside computer service or operating their own in-house system?

As noted last month, only 5 per cent of non-computerized dealers listed "present economic situation" as their reason, while 54 per cent said in-house computers were "too costly." These results indicate that dealers, like many other potential computer users, are waiting for prices to come down.

Lack of communication?

Combining the information from the Southwest dealers survey with a survey of computer vendors conducted by I&T last fall indicates that many of the non-computerized dealers simply haven't been given enough information about the costs of computers.

Note in the accompanying table that 34 per cent of non-computerized dealers expect to invest $10,000 or more for a computer

(Continued on page 52)

Confirmation – and a grain of salt

Anyone who does surveys likes to see the results confirmed by a completely independent survey conducted by someone else.

Thus it was nice to see that a survey by Frost & Sullivan, a New York business research firm, showed support for the data gathered in the Southwest dealers survey.

There were 345 responses to the Frost & Sullivan study, which looked at farm stores and fertilizer stores along with implement dealerships.

"Slightly more than a third of our respondents reported that they had data processing," Frost & Sullivan found, adding that "interestingly, almost 40 per cent of our respondents indicated they were going to get either another data processing system or service in the future. Greatest interest was from farm implement dealerships, with farm stores close behind."

By comparison, the Southwest survey found 58 per cent of implement dealers has some kind of computer connection, including 30 per cent saying they own a computer. Another 30 per cent of non-owners said they were planning to buy one.

But Frost & Sullivan added a cautionary note regarding the reliability of their survey results, and similar cautions exist for most surveys.

"It is our experience," they wrote, "that people who have data processing or who are in the process of shopping for it are more likely to complete a survey such as ours, thereby distorting the numbers."

The complete Frost & Sullivan report, Number 1138, is available for $1,350 from the research firm at 106 Fulton St., New York, N. Y. 10038.

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT CO.
Dothan, Alabama
January 10, 1984

ALLIS-CHALMERS TRACTORS

7060 diesel, 1977 (Good)	12,000*
7030 diesel, cab, 1974 (Good)	5600
200 diesel, 1973 (Fair)	3650*
WD, 1949 (Rough)	350
B, cult., 1940 (Fair)	575
G, cult., 1947 (Fair)	675

CASE TRACTORS

2290 diesel, cab, 1981 (Excellent)	17,250
1370 diesel, 1977 (Good)	9250
1370 diesel, 1974 (Rough)	5900*
1175 diesel, 1972 (Fair)	3950
1070 diesel, cab, 1974 (Excellent)	7600
870 diesel, 1973 (Fair)	3300*

DAVID BROWN TRACTOR

990 diesel, 1969 (Fair)	975

MASSEY-FERGUSON TRACTORS

2705 diesel, cab, duals, 1979 (Excellent)	12,750*
1105 diesel, 1975 (Good)	4400*
1105 diesel, 1975 (Good)	5450
285 diesel, 1976 (Excellent)	7900
275 diesel, 1977 (Good)	6750
275 diesel, 1977 (Excellent)	7450
255 diesel, 1976 (Good)	5150
245 diesel, 1978 (Excellent)	5800
235 diesel, 1975 (Good)	3775
180 diesel, 1967 (Rough)	2200
178 diesel, (Good)	3500
165 diesel, 1971 (Fair)	2600
165 diesel, 1967 (Fair)	2750*
165 diesel, 1967 (Fair)	2800
165 diesel, 1966 (Fair)	2700*
165 diesel, 1966 (Fair)	2800*
165 diesel, 1966 (Fair)	2400
150 diesel, 1969 (Good)	3050*
150 diesel, 1967 (Fair)	2400
150 diesel, 1967 (Good)	3300
150 diesel, 1965 (Good)	3150
135 diesel, 1974 (Excellent)	3400*
135 diesel, 1973 (Excellent)	3400*
135 diesel, 1970 (Excellent)	3500*
135 diesel, 1967 (Excellent)	3400
135, 1967 (Good)	3000*
135 diesel, 1966 (Good)	3100*
135 diesel, 1966 (Good)	2900
135 diesel, 1966 (Good)	3100
135 diesel, 1966 (Good)	3050*
40 diesel, 1971 (Rough)	1600
40, 1956 (Rough)	600
35, 1963 (Excellent)	2300
35 diesel, 1958 (Rough)	1050*
35, 1956 (Good)	1000
35, 1956 (Rough)	950*
35, 1956 (Good)	1350
TO30, 1952 (Good)	1150*
TO30, 1952 (Rough)	500
20, 1967 (Good)	2400*
TO20, 1950 (Rough)	575

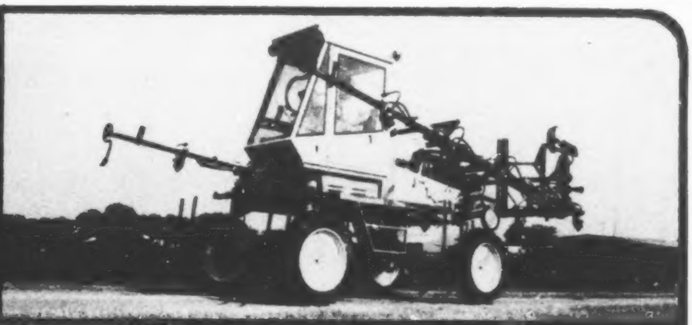
FORD-FERGUSON TRACTORS

9N, 1944 (Good)	800*
9N, 1946 (Excellent)	1250*
9N, 1944 (Good)	800
9N, 1941 (Excellent)	1150

FORD TRACTORS

8700 diesel, cab, duals, 1977 (Excellent)	10,300*
8600 diesel, cab, 1972 (Rough)	4000
7700 diesel, 1976 (Good)	9600
7600 diesel, 1977 (Good)	6100
7000 diesel, 1973 (Good)	4350
7000 diesel, 1972 (Good)	4950*
6600 diesel, 1976 (Excellent)	7900
6600 diesel, 1976 (Excellent)	8000
6000 diesel, 1962 (Rough)	700*
5610 diesel, 1983 (Excellent)	12,800
5000 diesel, 1970 (Fair)	3650*
5000 diesel, 1970 (Fair)	4300*
5000 diesel, 1969 (Good)	3700*
5000 diesel, 1968 (Fair)	3500*
4000, 1968 (Rough)	2250*
4000 diesel, 1968 (Good)	3200
3600 diesel, 1975 (Good)	4900
3000 diesel, 1972 (Excellent)	4450
3000 diesel, 1968 (Good)	3200
3000 diesel, 1968 (Good)	3050
3000 diesel, 1968 (Good)	3400
3000 diesel, 1966 (Fair)	2800
2000, 1972 (Good)	3150
2000 diesel, 1972 (Excellent)	3600
860, 1957 (Excellent)	2350*
841, 1960 (Good)	1850
641, 1958 (Good)	1600
641, 1958 (Excellent)	2100
640, 1955 (Good)	1500
541 diesel, cult., 1958 (Good)	1400
Maj. diesel, ldr., 1956 (Rough)	450*
Maj. diesel, ldr., 1956 (Rough)	450
Sup. Dex. diesel, 1963 (Good)	1625
8N, 1952 (Good)	1425
8N, 1951 (Excellent)	1675
8N, 1951 (Excellent)	1750
8N, 1948 (Rough)	800
8N, 1950 (Good)	1100*
8N, 1950 (Good)	1250
8N, 1948 (Rough)	350
8N, 1948 (Fair)	950
8N, 1948 (Good)	1150
8N, 1948 (Good)	1100
8N, 1948 (Fair)	1050
8N, 1948 (Good)	1350

Spray Ram
by Sprayrite
It goes when you need to go...and that's the big difference between Spray Ram and other sprayers!



To go when you need to go requires more than mechanical reliability. It requires:

- Four wheel hydrastatic drive
- Low ground surface pressure
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- Matched horsepower

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- Sprayrite Ultra Low Volume System

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Write In (38) on Reply Card

8N, 1948 (Good)	1250*

INTERNATIONAL HARVESTER TRACTORS

1466 diesel, 1975 (Rough)	4700
1466 diesel, 1974 (Rough)	5350
1066 diesel, 1974 (Fair)	4600*
686 diesel, 1979 (Excellent)	9100
686 diesel, 1978 (Good)	7700
686 diesel, 1977 (Good)	8400
686 diesel, 1977 (Good)	8200*
686 diesel, 1977 (Fair)	5500
686 diesel, 1977 (Good)	7200*
666 diesel, 1972 (Excellent)	4950*
656 diesel, 1968 (Fair)	3300
574 diesel, 1973 (Good)	3450
574 diesel, 1973 (Fair)	2750*
544 diesel, 1969 (Fair)	2850
464, 1974 (Rough)	2200*
454 diesel, 1974 (Good)	3800
284 diesel, 1980 (Excellent)	7600
C, 1948 (Good)	475
140, 1968 (Good)	2300
A, har., 1940 (Fair)	425
154, cab, mo., 1973 (Good)	1450*
Cub, cult., plt., 1948 (Good)	975

JOHN DEERE TRACTORS

4840 diesel, cab, 1978 (Excellent)	25,900*
4820 diesel, cab, 1978 (Excellent)	23,000
4630 diesel, 1976 (Excellent)	12,500
4630 diesel, 1974 (Good)	9600
4440 diesel, 1979 (Excellent)	22,100
4430 diesel, duals, 1976 (Excellent)	13,400
4430 diesel, cab, 1976 (Excellent)	11,400*
4430 diesel, cab, 4WD, 1975 (Good)	10,500*
4430 diesel, 1975 (Excellent)	14,000
4430 diesel, 1974 (Good)	8500
4430 diesel, cab, 1974 (Excellent)	11,100
4430 diesel, 1973 (Good)	10,000
4240 diesel, 1979 (Good)	16,500
4230 diesel, cab, 1977 (Excellent)	12,600
4230 diesel, 1976 (Good)	8250
4230 diesel, 1974 (Fair)	7800
4020 diesel, duals, 1970 (Fair)	5400
4020 diesel, duals, 1969 (Excellent)	7000
4020 diesel, 1967 (Rough)	2900
4020 diesel, 1966 (Fair)	4400*
3020 diesel, 1969 (Good)	4600*
3020 diesel, 1966 (Good)	4750*
3020 diesel, 1965 (Good)	4800
3010 diesel, 1963 (Rough)	2200*
2840 diesel, 1979 (Excellent)	8500
2640 diesel, 1978 (Good)	6800*
2640 diesel, 1976 (Excellent)	7800*
2630 diesel, 1975 (Rough)	3800*
2440 diesel, 1979 (Excellent)	6600
2240 diesel, 1977 (Excellent)	6000
2240 diesel, 1976 (Rough)	3000*
2040 diesel, 1981 (Excellent)	5800*
2040 diesel, 1978 (Excellent)	5950*
2030 diesel, 1973 (Good)	4700
2020 diesel, 1971 (Fair)	2100
2010 diesel, 1962 (Rough)	850
2010 diesel, 1962 (Fair)	1450
1120 diesel, (Fair)	2100
1020 diesel, (Good)	3400
1010, 1964 (Rough)	725
950, 1980 (Excellent)	6000
820 diesel, 1968 (Rough)	1900*
320, 1958 (Excellent)	1800

LONG TRACTOR

350 diesel, (Good)	2600

OLIVER TRACTORS

2-150 diesel, 1969 (Excellent)	6100*
1750 diesel, 1968 (Good)	3525
500 diesel, (Rough)	175

KUBOTA TRACTORS

L245 diesel, mo., 1978 (Good)	1800
L210 diesel, 1973 (Good)	2400
L185 diesel, mo., 1978 (Good)	1700
L175 diesel, 1974 (Good)	1500

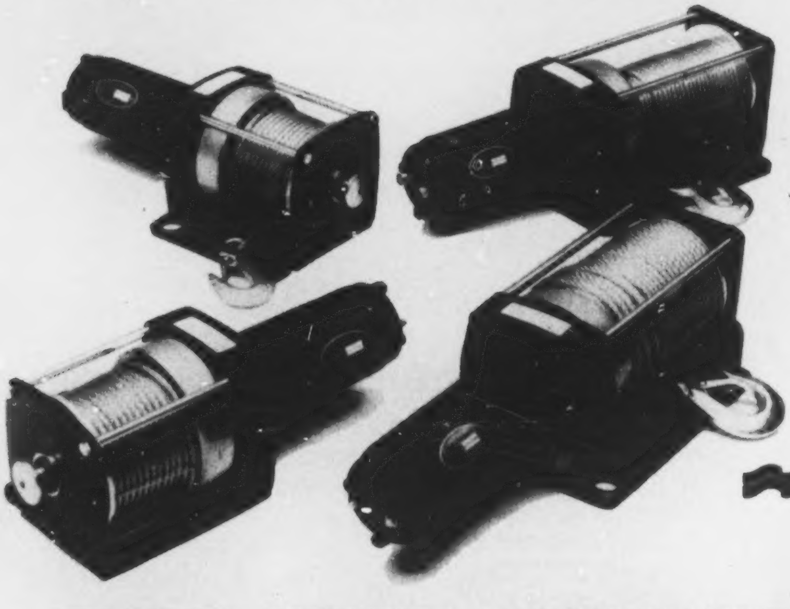
YODER & FREY, INC.
Archbold, Ohio
January 9, 1984

INTERNATIONAL HARVESTER TRACTORS

B, cult., 1947 (Fair)	800*
Cub, mo, cult. (Fair)	1750
Sup. C, cult., 1952 (Rough)	800*
H, ldr., 1948 (Rough)	600
M, 1946 (Fair)	525
M, 1950 (Fair)	750*
Sup. M, 1952 (Rough)	810*
Sup. M diesel, 1952 (Fair)	985
Sup. M, 1953 (Fair)	900*
Sup. M, 1952 (Rough)	775*
B275,	1000
300, 1955 (Good)	1100
400 diesel, 1955 (Rough)	600
B414, (Fair)	1900*
450, 1957 (Rough)	900*
450 diesel, 1957 (Fair)	1350
460 util., 1960 (Rough)	1450
504, 1965 (Fair)	1900*
504, 1965 (Fair)	1800
560 LP, 1959 (Fair)	925
560, 1960 (Fair)	1700
560, 1959 (Rough)	1700*
560, 1960 (Rough)	1800*
560, 1959 (Rough)	1750*
560, 1961 (Fair)	1800*
560, 1960 (Good)	2500
560, 1960 (Fair)	1800*
544, (Fair)	2475
656, 1969 (Good)	30[illegible]
656 Hydro, 1970 (Fair)	3100*
656, 1968 (Good)	3900*
666, 1975 (Fair)	3700*
706 diesel, 1965 (Rough)	2400
706, 1965 (Fair)	3000
706, 1967 (Fair)	2000*
706, 1967 (Fair)	3000*
756 diesel,1967 (Good)	4100*
766, 1976 (Good)	3900*
806 diesel, 1967 (Fair)	4000*
806, 1963 (Fair)	3400*
806 diesel, 1965 (Rough)	4100
806 diesel, 1966 (Fair)	3200
806 diesel, 1964 (Fair)	5400*
806, 1965 (Good)	2725
806 diesel, 1965 (Fair)	4100*
806 diesel, 1963 (Good)	4125
806 diesel, 1966 (Fair)	4000*
856, 1969 (Fair)	6300*
856, 1968 (Fair)	6000*
856 diesel, 1968 (Fair)	6100*
966 diesel, 1974 (Fair)	6300
966 diesel, 1975 (Good)	7600*
966, 1973 (Good)	6300
986, 1979 (Good)	12,600*
1066, 1975 (Fair)	5700*
1066, 1976 (Rough)	9250*
1066, 1974 (Rough)	5750*
1066, 1975 (Good)	7250*
1066, 1976 (Fair)	8000*
1066, 1975 (Good)	8100*
1086, 1978 (Fair)	11,900
1206 diesel, 1963 (Rough)	5100*
1206 diesel, 1965 (Rough)	6500*
1256 diesel, 1968 (Rough)	4000*
1256, 1967 (Good)	6500*
1456, 1969 (Good)	5700*
1466, 1975 (Good)	7900*
1466, 1973 (Rough)	4275
1466, 1973 (Rough)	4275
1466, 1975 (Rough)	4275

(More...)

RELY ON RULE!



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Auctions

(continued)

1566, 1975 (Fair)	8600*
4166, (Fair)	7250*

DAVID BROWN TRACTORS

990 (Fair)	1850*
995 diesel, 1976 (Fair)	3000*
1200 diesel, 1968 (Fair)	2700*

ALLIS-CHALMERS TRACTORS

WD-45 diesel, ldr., 1950 (Rough)	700*
W-14, plow, 1963 (Rough)	1400*
D-14, bld., 1959 (Fair)	1475
D-15, 1965 (Rough)	1850
D-15, ldr., 1967 (Fair)	2575
D-17, 1965 (Fair)	1625*
D-17, 1960 (Rough)	1450
D-21, 1967 (Fair)	3400*
180, 1969 (Good)	1900
190, 1966 (Fair)	2500
190XT, 1970 (Fair)	3300
190XT, 1970 (Good)	3800*
7040, 1979 (Fair)	7750*

OLIVER TRACTORS

55, 1956 (Fair)	1150
1600, 1962 (Fair)	2300*
1650 diesel, 1966 (Rough)	2000
1650 diesel, (Fair)	2150
1750 diesel, 1967 (Rough)	4100*
1750, 1965 (Fair)	3400*
1750 diesel, 1967 (Fair)	4250*
1800,	2350
1800, 1961 (Fair)	2000*
1800, 1962 (Rough)	1900
1850, 1966 (Fair)	2400*
1850 diesel, 1967 (Fair)	3800*
1850, 1966 (Fair)	2400
1855, 1972 (Good)	7300
1855 diesel, 1969 (Fair)	4100*
1855, 1972 (Fair)	4050*
1855 diesel, 1972 (Fair)	5000*
1950-T diesel, 1968 (Fair)	4200*
1950-T, (Fair)	3700*

JOHN DEERE TRACTORS

A, bld., 1950 (Fair)	500*
A, 1946 (Rough)	600*
B, cult., 1947 (Fair)	400*
MT, 1950 (Rough)	500
MT, cult., 1951 (Rough)	675
60, 1956 (Good)	1470
70 diesel,	750
70, 1954 (Fair)	1000*
720, 1957 (Good)	900
720 diesel, 1957 (Fair)	1400*
720, 1958 (Rough)	1400*
730 diesel, 1959 (Fair)	1900*
820 diesel, 1957 (Good)	2500
950 diesel, 1977 (Good)	4700*
3010 diesel, 1962 (Fair)	4000
3020 diesel, 1968 (Rough)	4900*
3020 diesel, 1967 (Good)	5875
4010 diesel, 1963 (Fair)	4500
4010 diesel, 1964 (Fair)	3300
4010 diesel, 1963 (Fair)	4600*
4020 diesel, 1967 (Good)	6600*
4020 diesel, 1971 (Good)	6650
4020 diesel, 1971 (Good)	7400*
4020 diesel, 1966 (Fair)	5450
4020, 1965 (Fair)	6000*
4020 diesel, 1966 (Fair)	4900*
4020, 1967 (Fair)	6700*
4020 diesel, 1964 (Fair)	5750
4020 diesel, 1965 (Fair)	5200
4020 diesel, 1965 (Good)	6000*
4020 diesel, 1964 (Fair)	5450
4020 diesel, 1966 (Fair)	6550
4020 diesel, 1967 (Fair)	5900*
4020, 1965 (Rough)	3150
4020 diesel, 1965 (Fair)	4900*
4020 diesel, 1968 (Fair)	6000*
4020 diesel, 1967 (Good)	5600*
4230, 1976 (Good)	12,750*
4230, 1973 (Rough)	7700*
4320, 1972 (Good)	7850
4320 diesel, 1972 (Good)	7900*
4430, 1975 (Good)	13,500*
4430, 1974 Fair)	9700
4430, 1975 (Good)	10,300*
4630, 1974 (Fair)	7900*
4840, duals, 1979 (Excellent)	24,000*
5020, 1969 (Fair)	4800*
5020, 1969 (Good)	7000*
8630, (Good)	24,500*

DEUTZ TRACTORS

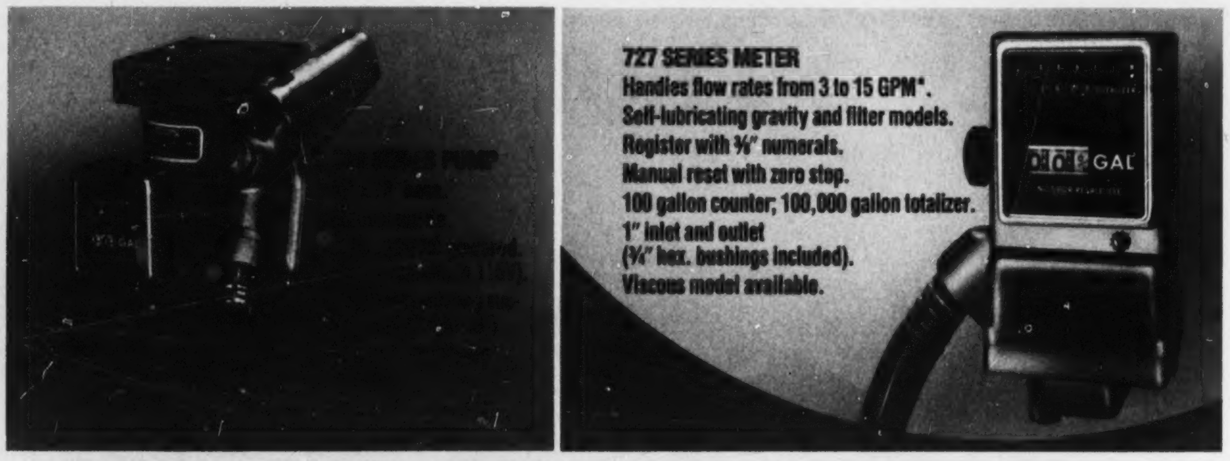
D10006, (Fair)	5100*
D13006, (Fair)	4500*

FORD TRACTORS

8N, 1952 (Fair)	1250
8N, ldr., 1950 (Fair)	1200
8N, 1950 (Fair)	1550*
8N, 1950 (Fair)	1250*
8N, 1947 (Rough)	850
9N,	375
9N, 1941 (Rough)	825*
9N, 1940 (Fair)	750*
600, mo., 1956	2425
600, ldr., 1957 (Good)	2200*
641, 1955 (Fair)	2175
800, ldr., 1955 (Rough)	2200*
2000, 1969 (Rough)	2900*
2000 diesel, 1972 (Rough)	3500
3000 diesel, 1970 (Fair)	3450*
4000 Select-O-Speed, 1971 (Rough)	1700
4000 diesel, 1969 (Rough)	2650
4000 Select-O-Speed, 1964 (Fair)	1200
4500, ldr., 1975 (Rough)	3850
5000 diesel, 1972 (Good)	6600
6000 diesel, 1961 (Rough)	1400*
6000, 1962	800
6000 diesel, 1960 (Fair)	1900*
8000, 1973 (Rough)	3850
8000, 1971 (Fair)	5600*
8600, 1974 (Fair)	6700
9000, 1971 (Fair)	4800*
20, 1946 (Fair)	1160*
TW-30,	23,500*
Jub., ldr.,	1750
Jub.,	725

CASE TRACTORS

400, 1958 (Rough)	750*
400, 1959 (Rough)	960
530, ldr, 1964 (Fair)	1900*
530, 1965 (Rough)	1350*
830 diesel, 1964 (Fair)	1700*
830 diesel, 1966 (Rough)	1600
830 diesel, 1965 (Fair)	1700*
900 diesel, 1966 (Good)	1650*
930 diesel, 1967 (Fair)	2200*
970 diesel,	6000
1030 diesel, 1967 (Fair)	2300
1030, 1967 (Good)	3800*
1030, 1966 (Fair)	3000
1070 diesel, 1974 (Fair)	5000*
1070 diesel, 1972 (Fair)	5400*
1175, 1973 (Good)	7100*



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COMMERCIAL PRODUCTS DIVISION
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(219) 423-2552
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TOTAL QUALITY ASSURANCE

UL listed
Not for resale of fuel
*Flow rates stated are subject to conditions of installations and accessories used

1470, (Good)	7250*
2470, (Fair)	8000*

MINNEAPOLIS-MOLINE TRACTORS

Jet Star 4, (Rough)	950
U-302, 1964 (Fair)	1925
M-602, 1960 (Fair)	1025

FERGUSON & MASSEY-FERGUSON TRACTORS

50 diesel, (Good)	2200*
65 diesel, 1960 (Rough)	1750*
65 diesel, 1960 (Rough)	1800*
85, 1959 (Fair)	1625
135, ldr.,	2975
165, 1966 (Good)	2100*
165 diesel, 1968 (Fair)	3300
175, ldr., 1967 (Fair)	4600
180 diesel, 1968 (Fair)	3500*
180 diesel, 1969 (Rough)	3200
245 diesel, 1978 (Fair)	4200*
1080, (Good)	5750
1105, 1977 (Fair)	6000*
1135 diesel, 1974 (Fair)	7200*
1155, (Fair)	7400*
2805, (Excellent)	1300*

NOTES:
Prices reported are for individual sales at wholesale on an "as is," "cash and carry" basis. Prices reported are not averages.

Condition Classifications:
EXCELLENT: Engine in perfect condition, 400 to 600 hours of use. Rubber—80% tread remaining, no breaks or cracks. Paint—original and bright. General appearance: excellent.

GOOD: Engine in good running condition. Rubber—70% tread remaining, no breaks or cracks. Paint—original or a good repaint job. General appearance: good over-all.

FAIR: Engine possibly in need of a minor overhaul. Rubber—60% tread remaining, some cracking evident in sidewalls. Paint—only fair, weathered and some rust apparent. General appearance: worn, some dents, minor parts (gage covers, etc.) missing or broken.

ROUGH: Engine obviously in need of a major overhaul. Rubber—smooth. Paint—scarred, weathered, rusty. General appearance: dents, ruptures, broken parts, loose wires, components (such as lights) broken, missing or inoperative.

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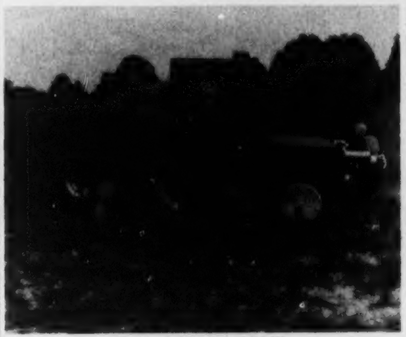
• No-Till Hoe Drill • The Marliss Bean Machine and the **• 27' No-Till Drill**



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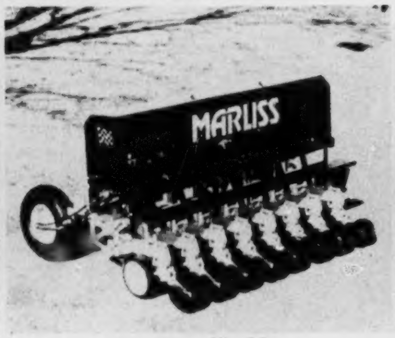

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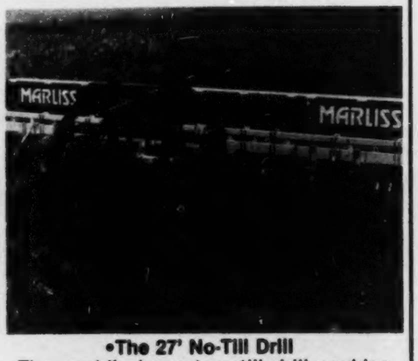

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Crop(s)____________________

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Southwest Connection

(Continued from page 22)

system, including installation and software.

The I&T vendor survey got price quotes from eight computer companies for one-user computer systems, with enough software and hardware to handle the basic inventory and accounting needs of a moderate-sized dealer. The average price for the eight systems was $17,862, with a range from $10,500 to $24,730.

So if computer vendors are offering systems that meet the price expectations of dealers, why haven't more dealers bought?

The dealer survey suggests the vendors may not have spread their message well enough: 31 per cent of dealers say their present accounting methods are adequate; 18 per cent said "no one has actually shown me data on cost and savings," and 28 per cent said they "have yet to investigate this aspect."

It must be noted, before drawing any sweeping conclusions from the survey, that the 252 survey respondents, members of the Southwest Hardware & Implement Assn., cannot be taken as a representative cross-section of dealers nationwide, or even as a statistically ideal sample of dealers in three states.

But looking at the responses from the survey group leads to some conclusions about use of computers by dealers:

- Big dealers already have computers, and have had them for several years. Given the rapid pace of change in the electronics industry, some of these dealers may be ready to upgrade their equipment.
- Dealers are convinced of the value of computers, and the majority of dealers with annual sales over $1 million already have some kind of computer connection.
- Small and medium-sized dealers, with annual sales under $3 million, would appear to be the greatest growth market for use of in-house computers, and are willing to invest realistic sums of money to purchase a system.
- If dealers see the benefit in computers, and are willing to pay the price, but haven't yet bought, it may be that computer vendors haven't completely met the challenge of explaining costs and benefits to these potential buyers. I&T

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Hydraulic Couplings

House of Hose, Inc. has two complete lines of hydraulic couplings including bent tube fittings. Our Power-Swage couplings are designed for House of Hose, Couplamatic and Cross Manufacturing swage machines. Our Versa-Crimp couplings are designed for House of Hose, Weatherhead and Imperial-Eastman crimp machines.

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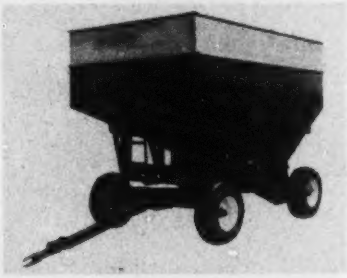
KUKER INDUSTRIES, INC.



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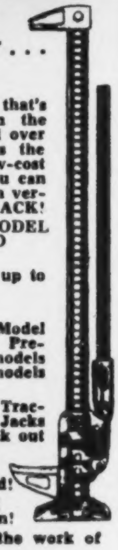

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The business magazine of the farm & industrial equipment industry

March 31, 1984

FIVE DOLLARS

Implement & Tractor

RED BOOK

Tractor and equipment specifications

Hydraulic components data

Nebraska test reports

Full contents page A2

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March 31, 1984 • Vol. 99 • No. 5

Implement & Tractor

The business magazine of the farm and industrial equipment industry

68th annual RED BOOK issue

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Editorial, advertising
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Telex: 42-4156; Answerback
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Bill Fogarty, Editor
Scott R. Nesbitt, Managing Editor
Irma Allread, Associate Editor
Kevin Callahan, Art Director
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Abbreviations:
DNA – Does not apply.
NA – Not available.
Std. – Standard.
Opt. – Optional
Linear measurements may be to nearest ¼-inch.

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The Nebraska Tractor Test Law

Purpose of the Law—The Nebraska Tractor Test Law originated in 1919 for the purpose of verifying advertising claims on tractors offered for sale to Nebraska farmers.

Its position as the only independent test laboratory in the United States devoted to the evaluation of tractor performance proved of unique value to the industry. The Agricultural Tractor Test Code used in the Nebraska Tests was developed with the approval and assistance of the American Society of Agricultural Engineers and the Society of Automotive Engineers, and is revised and updated periodically as the need arises. The Test Code (ASAE S209.4 or SAE J708c) is published in the ASAE Yearbook and SAE Handbook.

Provisions of the Law—Stated briefly, the Nebraska Tractor Test Law provides:

That a stock unit of each agricultural tractor model sold in Nebraska shall be tested and passed upon by a board of three engineers under the supervision and direction of the University of Nebraska. Each tractor must be certified as a stock model and will be equipped with the common power consuming accessories. An official representative of the manufacturer is present during the test to see that the performance meets company standards.

The Department of Agriculture shall deny to any manufacturer the right to do business in the State on complaint of two or more bona fide customers that the company has failed to maintain an adequate service station with a full supply of replacement parts within the state and within reasonable distance of customers.

The law further states that it shall be unlawful to publish excerpts from any official test in advertising material without publishing the entire report.

The provisions of the Nebraska Test Law do not apply to any tractor the engine of which develops less than 20 horsepower; or to tractors manufactured, sold and used for heavy construction when identical units are not sold and used for agricultural purposes.

Explanation of Test Report

General

Tractors are tested at the University of Nebraska according to the Agricultural Tractor Test Code approved by the American Society of Agricultural Engineers and the Society of Automotive Engineers or official Nebraska test procedure.

The manufacturer selects the tractor to be tested and certifies that it is a stock model. Each tractor is equipped with the common power consuming accessories such as power steering, power lift pump, generator, etc., if available. Power consuming accessories may be disconnected only when the means for disconnecting can be reached from the operating station. An official representative of the company is present during the test to see that the tractor gives its optimum performance. Additional weight may be added to the tractor as ballast if the manufacturer recommends use of such ballast. The static tire loads and the tire inflation pressures must conform to the specifications of Tire and Rim Association.

Preparation for Test

The engine crankcase is drained and refilled with new oil conforming to specifications in the operator's manual. The operator's manual is also used as the guide for selecting the proper fuel and for routine lubrication and maintenance operations.

The tractor is limbered up for a minimum of three hours on the drawbar. Preliminary adjustment of the tractor is permitted at this time. Any parts added or replaced during the limber-up run, or any subsequent runs, are mentioned in the individual test reports. The tractor is equipped with approximately the amount of added ballast that is to be used during the drawbar runs.

PTO Performance

Power take-off performance runs are made by connecting the power take-off to a dynamometer. During a preliminary power take-off run the manufacturer's representative may make adjustment for the fuel, ignition or injection timing and governor control settings. These settings must be maintained for the remainder of the test. The manually operated governor control mechanism is set to provide the high-idle speed specified by the manufacturer. During the power take-off runs an ambient air temperature of approximately 75°F. (24.0°C) is maintained.

Maximum power is obtained at the rated engine speed specified by the manufacturer with the governor control lever set for maximum power. This same setting is used for all subsequent PTO runs. Time of the run is two hours. Whenever the power take-off speed during the maximum power run differs from the speeds set forth in the ASAE and SAE standards, an additional run is made at either 540 or 1000 rpm of the power take-off shaft. Time of this run is one hour.

Drawbar Performance

Maximum drawbar power is shown for the normal field speed selected by the manufacturer. All engine adjustments are the same as those used in the power take-off runs. If the manufacturer specifies a different rated engine speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified.

Maximum drawbar power is determined within the following limits: (1) slip of the drivers must not exceed 15% for pneumatic tires on the concrete test course or 7% for steel cleats on the well packed earthen test course, (2) ground speeds must not exceed 10 miles per hour, (3) safe stability limits of the tractor must not be exceeded, (4) no other operating limit of the tractor must be exceeded. Drawbar load is applied until the manufacturer's rated engine speed is obtained with maximum governor control lever setting. Travel speed, drawbar pull and other data are recorded over two 500-foot straight level areas.

Fuel consumption is determined at the manufacturer's selected travel speed with the drawbar pull set: (1) to give rated engine rpm, (2) 75% of the pull at rated engine rpm, (3) 50% of the pull at rated engine rpm, and (4) maintaining the same load and travel speed as in (3) by shifting to a higher gear and reducing the engine rpm.

This summary shows the drawbar horsepower, corresponding travel speed and fuel consumption at 100%, 75% or 50% loads, and 50% of pull at reduced engine speed.

Also shown is the maximum drawbar horsepower produced for two 500-foot travel sections and corresponding travel speed, the maximum drawbar pull and the corresponding drive-wheel slippage.

In addition, the "lugging ability" obtained by increasing the load so that the full throttle engine speed drops to 80% of rated is given as a percent increase with respect to the pull at rated engine rpm.

The maximum drawbar horsepower and the corresponding speed and drawbar pull for other selected gears or travel speeds are shown in the individual test reports.

Sound Measurement

Sound is recorded during each of the Drawbar Performance runs as the tractor travels on a straight section of the test course. The dB(A) sound level is obtained with the microphone located near the right ear of the operator. Bystander sound readings are taken with the microphone placed 25 feet (7.5 m) from the line of travel of the tractor. An increase of 10dB(A) will approximately double the loudness to the human ear.

Individual copies of any test report, annual summary booklets or annual subscription (at $4.50) are available. For complete information write to **Department of Agricultural Engineering, University of Nebraska—Lincoln, Lincoln, Nebraska 68583.**

NEBRASKA TRACTOR TEST 1453 — STEIGER PANTHER CP-1325 DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1002 rpm)								
299.19 (223.04)	2100	18.071 (68.406)	0.421 (0.256)	16.55 (3.261)	185 (84.9)	67 (19.3)	75 (23.8)	28.890 (97.557)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
260.94 (194.58)	2156	16.355 (61.910)	0.437 (0.266)	13.95 (3.143)	180 (82.2)	66 (19.2)	75 (23.9)	....
0.00 (0.00)	2252	4.590 (17.375)	....	....	170 (76.9)	66 (18.9)	73 (22.8)	....
134.08 (99.98)	2214	10.526 (39.845)	0.547 (0.333)	12.74 (2.509)	174 (79.2)	66 (19.2)	74 (23.3)	....
299.79 (223.55)	2100	18.127 (68.618)	0.422 (0.257)	16.54 (3.258)	186 (85.3)	68 (19.7)	76 (24.2)	....
67.52 (50.35)	2234	7.713 (29.197)	0.797 (0.485)	8.75 (1.724)	172 (77.8)	68 (19.7)	75 (23.9)	....
199.10 (148.47)	2194	13.413 (50.774)	0.470 (0.286)	14.84 (2.924)	178 (81.4)	68 (19.7)	76 (24.2)	....
Av 160.24 **Av (119.49)**	**2192**	**11.787** **(44.619)**	**0.513** **(0.312)**	**13.59** **(2.678)**	**177** **(80.6)**	**67** **(19.4)**	**75** **(23.7)**	**28.960** **(97.794)**

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
261.75 (195.18)	14136 (62.88)	6.94 (11.18)	2099	2.94	17.798 (67.374)	0.474 (0.288)	14.71 (2.897)	184 (84.4)	65 (18.3)	74 (23.1)	28.835 (97.371)
75% of Pull at Maximum Power—Ten Hours 7th Gear											
209.22 (156.01)	10811 (48.09)	7.26 (11.68)	2180	2.26	15.092 (57.129)	0.505 (0.306)	13.86 (2.731)	176 (79.8)	49 (9.7)	53 (11.9)	28.860 (97.456)
50% of Pull at Maximum Power—Two Hours 7th Gear											
142.21 (106.04)	7208 (32.06)	7.40 (11.91)	2203	1.44	11.901 (45.052)	0.584 (0.355)	11.95 (2.354)	180 (82.2)	74 (23.3)	86 (30.0)	[illegible] (96.848)
50% of Pull at Reduced Engine Speed—Two Hours 10th Gear											
142.18 (106.02)	7206 (32.06)	7.40 (11.90)	1289	1.48	9.410 (35.621)	0.462 (0.281)	15.11 (2.976)	182 (83.3)	74 (23.1)	86 (29.7)	28.670 (96.814)
MAXIMUM POWER IN SELECTED GEARS											
234.05 (174.52)	33802 (150.36)	2.60 (4.18)	2129	14.81	2nd Gear			177 (80.6)	49 (9.4)	53 (11.7)	28.830 (97.355)
256.08 (190.96)	29501 (131.22)	3.26 (5.24)	2099	8.68	3rd Gear			180 (81.9)	52 (11.1)	58 (14.4)	28.820 (97.321)
260.15 (194.00)	24224 (107.75)	4.03 (6.48)	2099	5.98	4th Gear			186 (85.3)	69 (20.6)	80 (26.7)	28.760 (97.118)
264.50 (197.24)	20226 (89.97)	4.90 (7.89)	2097	4.56	5th Gear			186 (85.3)	69 (20.6)	80 (26.7)	28.780 (97.186)
265.31 (197.84)	16949 (75.39)	5.87 (9.45)	2099	3.52	6th Gear			186 (85.3)	68 (20.0)	79 (26.1)	28.790 (97.220)
266.97 (199.08)	14415 (64.12)	6.95 (11.18)	2099	2.78	7th Gear			186 (85.6)	66 (18.[illegible])	77 (25.0)	28.810 (97.287)
264.37 (197.14)	11844 (52.68)	8.37 (13.47)	2099	2.45	8th Gear			186 (85.6)	67 (19.4)	77 (25.0)	28.760 (97.118)

LUGGING ABILITY IN 7th GEAR

Crankshaft Speed rpm	2099	1888	1687	1470	1254	1048
Pull—lbs (kN)	14415 (64.12)	16663 (74.12)	18086 (80.45)	19160 (85.23)	19660 (87.40)	19164 (85.25)
Increase in Pull %	0	16	25	33	36	33
Power—Hp (kW)	266.97 (199.08)	275.82 (205.68)	266.99 (199.09)	244.91 (182.63)	214.33 (159.83)	174.72 (130.29)
Speed—Mph (km/h)	6.95 (11.18)	6.21 (9.99)	5.54 (8.91)	4.79 (7.71)	4.09 (6.58)	3.42 (5.50)
Slip %	2.78	3.44	3.76	4.25	4.25	4.25

Department of Agricultural Engineering

Dates of Test: September 27 to October 13, 1982

Manufacturer: STEIGER TRACTOR, INC., 406 Main Avenue, Fargo, North Dakota 58126

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8376 **Fuel weight** 6.974 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SF **To motor** 8.645 gal *(32.725 l)* **Drained from motor** 6.291 gal *(23.813 l)* **Transmission and hydraulic lubricant** SAE 10 hydraulic transmission fluid **Final Drive lubricant** SAE 85W-90 **Total time engine was operated** 48.0 hours.

ENGINE: Make Caterpiller Diesel **Type** six cylinder vertical with turbocharger **Serial No.** 90U18642 **Crankshaft** lengthwise **Rated rpm** 1700 to 2100 **Bore and stroke** 5.4" × 6.5" *(137 mm × 165 mm)* **Compression ratio** 14.5 to 1 **Displacement** 893 cu in *(14636 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge and prestrainer **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type four wheel drive with duals **Serial No.** P32500511- **Tread width** rear 79" *(2007 mm)* to 136.4" *(3464 mm)* front 79" *(2007 mm)* to 136.4" *(3464 mm)* **Wheel base** 141.5" *(3594 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 75.5" *(1918 mm)* Vertical distance above roadway 45.5" *(1156 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph (km/h)** first 2.4 *(3.9)* second 2.9 *(4.7)* third 3.4 *(5.5)* fourth 4.1 *(6.6)* fifth 4.9 *(7.9)* sixth 5.8 *(9.3)* seventh 6.8 *(10.9)* eighth 8.2 *(13.2)* ninth 9.6 *(15.4)* tenth 11.6 *(18.7)* eleventh 14.0 *(22.5)* twelfth 16.5 *(26.5)* reverse 3.0 *(4.8)*, 5.1 *(8.2)* **Clutch** multiple wet disc hydraulically power actuated and operated by foot pedal **Brakes** dual caliper disc hydraulically operated by foot pedal and mechanically by hand lever **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 276" *(7.01 m)* left 276" *(7.01 m)* **Turning space diameter** (on concrete surface without brake) right 581.5" *(14.77 m)* left 581.5" *(14.77 m)* **Power take-off** 1002 rpm at 2100 engine rpm.

SUPPLEMENTARY TESTS

POWER AND FUEL CONSUMPTION AT 1900 RPM

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—907 rpm)								
308.35 (229.94)	1900	17.730 (67.138)	0.401 (0.244)	17.39 (3.425)	186 (85.7)	66 (19.1)	75 (23.8)	28.930 (97.692)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
272.04 (202.86)	16349 (72.72)	6.24 (10.04)	1900	3.60	17.727 (67.102)	0.454 (0.276)	15.35 (3.023)	184 (84.4)	66 (18.6)	71 (21.4)	28.740 (97.051)
MAXIMUM POWER IN SELECTED GEARS											
250.87 (187.08)	33742 (150.09)	2.79 (4.49)	1927	14.68	3rd Gear			179 (81.7)	50 (10.0)	55 (12.8)	28.830 (97.355)
260.27 (194.08)	27287 (121.38)	3.58 (5.76)	1899	7.72	4th Gear			187 (85.8)	67 (19.4)	78 (25.6)	28.760 (97.118)
268.60 (200.30)	22913 (101.92)	4.40 (7.07)	1899	5.51	5th Gear			189 (86.9)	69 (20.6)	80 (26.7)	28.770 (97.152)
272.78 (203.41)	19390 (86.25)	5.28 (8.49)	1899	4.25	6th Gear			188 (86.7)	68 (20.0)	79 (26.1)	28.790 (97.220)
275.74 (205.62)	16559 (73.66)	6.24 (10.05)	1898	3.35	7th Gear			186 (85.6)	67 (19.4)	78 (25.6)	28.800 (97.253)
274.21 (204.48)	13634 (60.65)	7.54 (12.14)	1900	2.94	8th Gear			188 (86.7)	67 (19.4)	77 (25.0)	28.770 (97.152)
272.91 (203.51)	11403 (50.72)	8.98 (14.44)	1898	2.23	9th Gear			186 (85.6)	67 (19.4)	76 (24.4)	28.770 (97.152)

POWER AND FUEL CONSUMPTION AT 1700 RPM

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—811 rpm)								
298.89 (222.88)	1700	16.781 (63.523)	0.392 (0.238)	17.81 (3.509)	187 (86.1)	66 (19.1)	74 (23.[illegible])	28.940 (97.726)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
262.29 (195.59)	17656 (78.54)	5.57 (8.97)	1701	3.84	16.848 (63.778)	0.448 (0.272)	15.57 (3.067)	189 (86.9)	71 (21.7)	82 (27.5)	28.720 (96.983)
MAXIMUM POWER IN SELECTED GEARS											
248.78 (185.52)	33679 (149.81)	2.77 (4.46)	1921	15.00	3rd Gear			180 (82.2)	51 (10.6)	57 (13.9)	28.830 (97.355)
245.57 (183.12)	29262 (130.16)	3.15 (5.06)	1701	9.40	4th Gear			188 (86.4)	67 (19.4)	78 (25.6)	28.760 (97.118)
258.01 (192.40)	24771 (110.18)	3.91 (6.29)	1700	6.29	5th Gear			190 (87.5)	69 (20.6)	80 (26.7)	28.770 (97.152)
261.80 (195.29)	20930 (93.10)	4.69 (7.55)	1699	4.72	6th Gear			190 (87.8)	69 (20.6)	80 (26.7)	28.780 (97.186)
266.20 (198.51)	17894 (79.59)	5.58 (8.98)	1702	3.84	7th Gear			189 (87.2)	68 (20.0)	79 (26.1)	28.800 (97.253)
266.14 (198.46)	14832 (65.98)	6.73 (10.83)	1700	3.11	8th Gear			189 (86.9)	67 (19.4)	76 (24.4)	28.770 (97.152)
266.54 (198.76)	12472 (55.48)	8.01 (12.90)	1699	2.61	9th Gear			188 (86.7)	67 (19.4)	76 (24.4)	28.770 (97.152)

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 153°F *(67.5°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1453.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Steiger Panther CP-1325 Diesel

TRACTOR SOUND LEVEL WITH CAB	1700 RPM dB(A)	1900 RPM dB(A)	2100 RPM dB(A)
Maximum Available Power—Two Hours	73.0	73.0	73.5
75% of Pull at Maximum Power—Ten Hours			78.0
50% of Pull at Maximum Power—Two Hours			75.0
50% of Pull at Reduced Engine Speed—Two Hours			74.0
Bystander in 12th gear			92.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*
Ballast	—Liquid (each inner)	205 lb *(93 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		13.5 in *(343 mm)*	13.5 in *(343 mm)*
Static Weight with Operator	—Rear	16560 lb *(7512 kg)*	16560 lb *(7512 kg)*
	Front	19310 lb *(8759 kg)*	18900 lb *(8573 kg)*
	Total	35870 lb *(16271 kg)*	35460 lb *(16085 kg)*

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1455 — STEIGER PANTHER CP-1360 DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1002 rpm)								
334.33 (249.31)	2100	19.962 (75.564)	0.416 (0.253)	16.75 (3.299)	186 (85.4)	64 (18.1)	75 (24.1)	28.873 (97.501)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
293.95 (219.20)	2173	18.243 (69.057)	0.433 (0.263)	16.11 (3.174)	180 (81.9)	66 (18.9)	75 (23.9)	....
0.00 (0.00)	2292	5.022 (19.010)	....	....	167 (75.0)	66 (18.9)	75 (23.9)	....
151.85 (113.23)	2242	11.740 (44.441)	0.539 (0.328)	12.93 (2.548)	172 (77.5)	66 (18.9)	76 (24.4)	....
335.30 (250.03)	2100	20.037 (75.848)	0.417 (0.253)	16.73 (3.296)	185 (85.0)	66 (18.9)	76 (24.2)	....
76.81 (57.28)	2268	8.508 (32.206)	0.772 (0.470)	9.05 (1.779)	168 (75.8)	66 (18.9)	76 (24.4)	....
224.90 (167.71)	2214	15.045 (56.952)	0.466 (0.284)	14.95 (2.945)	176 (80.3)	66 (18.9)	76 (24.2)	....
Av 180.47 **Av (134.58)**	**2215**	**13.099** **(49.585)**	**0.506** **(0.308)**	**13.78** **(2.714)**	**175** **(79.3)**	**66** **(18.9)**	**76** **(24.2)**	**28.850** **(97.422)**

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
289.91 (216.19)	15778 (70.18)	6.89 (11.09)	2099	3.18	19.850 (75.141)	0.477 (0.290)	14.60 (2.877)	181 (82.5)	64 (17.8)	65 (18.3)	28.960 (97.794)
75% of Pull at Maximum Power—Ten Hours 7th Gear											
232.20 (173.15)	12003 (53.39)	7.25 (11.68)	2196	2.52	16.813 (63.642)	0.505 (0.307)	13.81 (2.721)	176 (80.0)	59 (14.7)	64 (17.7)	28.793 (97.230)
50% of Pull at Maximum Power—Two Hours 7th Gear											
158.67 (118.32)	8002 (35.59)	7.44 (11.97)	2232	1.65	13.395 (50.705)	0.588 (0.358)	11.85 (2.333)	174 (78.9)	69 (20.6)	71 (21.4)	28.950 (97.760)
50% of Pull at Reduced Engine Speed—Two Hours 10th Gear											
159.24 (118.75)	8002 (35.59)	7.46 (12.01)	1311	1.60	10.759 (40.727)	0.471 (0.286)	14.80 (2.916)	175 (79.4)	65 (18.1)	65 (18.3)	28.955 (97.777)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %		Gear		Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
251.02 (187.19)	36123 (160.68)	2.61 (4.19)	2147	14.83		2nd Gear		176 (80.9)	60 (15.6)	60 (15.6)	28.930 (97.692)
277.28 (206.77)	32214 (143.30)	3.23 (5.19)	2098	8.82		3rd Gear		178 (81.1)	67 (19.4)	72 (22.2)	28.940 (97.726)
287.64 (214.49)	27057 (120.35)	3.99 (6.42)	2099	6.37		4th Gear		181 (82.5)	63 (17.2)	66 (18.9)	28.930 (97.692)
289.67 (216.01)	22276 (99.09)	4.88 (7.85)	2099	4.66		5th Gear		186 (85.3)	74 (23.3)	81 (27.2)	28.740 (97.051)
288.08 (214.82)	18505 (82.31)	5.84 (9.40)	2101	3.62		6th Gear		187 (85.8)	72 (22.2)	79 (26.1)	28.740 (97.051)
294.07 (219.29)	16004 (71.19)	6.89 (11.09)	2099	3.06		7th Gear		185 (85.0)	68 (20.0)	73 (22.8)	28.760 (97.118)
291.95 (217.70)	13152 (58.50)	8.32 (13.40)	2099	2.40		8th Gear		186 (85.3)	71 (21.7)	77 (25.0)	28.760 (97.118)

LUGGING ABILITY IN 7th GEAR

Crankshaft Speed rpm	2099	1893	1682	1467	1255	1045
Pull—lbs (kN)	16004 (71.19)	18275 (81.29)	19713 (87.69)	21093 (93.83)	21932 (97.56)	21673 (96.41)
Increase in Pull %	0	14	23	32	37	35
Power—Hp (kW)	294.07 (219.29)	301.43 (224.78)	287.48 (214.38)	267.38 (199.39)	237.37 (177.01)	195.50 (145.78)
Speed—Mph (km/h)	6.89 (11.09)	6.19 (9.95)	5.47 (8.80)	4.75 (7.65)	4.06 (6.53)	3.38 (5.44)
Slip %	3.06	3.54	4.03	4.35	4.66	4.51

Department of Agricultural Engineering

Dates of Test: September 20 to October 9, 1982

Manufacturer: STEIGER TRACTOR, INC., 406 Main Avenue, Fargo, North Dakota 58126

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8372 **Fuel weight** 6.971 lbs/gal *(0.835 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SF **To motor** 8.148 gal *(30.843 l)* **Drained from motor** 6.239 gal *(23.619 l)* **Transmission and hydraulic lubricant** SAE 10 hydraulic transmission fluid **Final drive lubricant** SAE 85W-90 **Total time engine was operated** 59.0 hours.

ENGINE: Make Caterpiller Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** 90U18786 **Crankshaft** lengthwise **Rated rpm** 1700 to 2100 **Bore and stroke** 5.4" × 6.5" *(137 mm × 165 mm)* **Compression ratio** 14.5 to 1 **Displacement** 893 cu in *(14636 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge and prestrainer **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type four wheel drive with duals **Serial No.** C36000506- **Tread width** rear 79" *(2007 mm)* to 136.4" *(3464 mm)* front 79" *(2007 mm)* to 136.4" *(3464 mm)* **Wheel base** 141.5" *(3594 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 75.5" *(1918 mm)* Vertical distance above roadway 45.4" *(1153 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph** *(km/h)* first 2.4 *(3.9)* second 2.9 *(4.7)* third 3.4 *(5.5)* fourth 4.1 *(6.6)* fifth 4.9 *(7.9)* sixth 5.8 *(9.3)* seventh 6.8 *(10.9)* eighth 8.2 *(13.2)* ninth 9.6 *(15.4)* tenth 11.6 *(18.7)* eleventh 14.0 *(22.5)* twelfth 16.5 *(26.5)* reverse 3.0 *(4.8)*, 5.1 *(8.2)* **Clutch** multiple wet disc hydraulically power actuated and operated by foot pedal **Brakes** dual caliper disc hydraulically operated by foot pedal and mechanically by hand lever **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 276" *(7.01 m)* left 276" *(7.01 m)* **Turning space diameter** (on concrete surface without brake) right 581.5" *(14.77 m)* left 581.5" *(14.77 m)* **Power take-off** 1002 rpm at 2100 engine rpm.

SUPPLEMENTARY TESTS

POWER AND FUEL CONSUMPTION AT 1900 RPM

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—907 rpm)								
344.37 (256.80)	1900	19.482 (73.747)	0.394 (0.240)	17.68 (3.482)	185 (84.9)	65 (18.5)	75 (23.7)	28.855 (97.439)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
296.06 (220.77)	17947 (79.83)	6.19 (9.96)	1900	3.83	19.599 (74.190)	0.461 (0.281)	15.11 (2.970)	183 (83.6)	67 (19.4)	68 (20.0)	28.955 (97.777)
MAXIMUM POWER IN SELECTED GEARS											
268.21 (200.01)	36080 (160.49)	2.79 (4.49)	1940	14.90		3rd Gear		180 (81.9)	61 (16.1)	62 (16.7)	28.930 (97.692)
289.88 (216.16)	30619 (136.20)	3.55 (5.71)	1899	7.95		4th Gear		183 (83.6)	64 (17.8)	68 (20.0)	28.940 (97.726)
291.03 (217.02)	24970 (111.07)	4.37 (7.03)	1901	5.68		5th Gear		188 (86.4)	74 (23.3)	81 (27.2)	28.740 (97.051)
293.91 (219.17)	21017 (93.49)	5.24 (8.44)	1899	4.19		6th Gear		189 (86.9)	73 (22.8)	80 (26.7)	28.740 (97.051)
301.05 (224.49)	18186 (80.90)	6.21 (9.99)	1899	3.54		7th Gear		186 (85.3)	70 (21.1)	75 (23.9)	28.760 (97.118)
297.41 (221.78)	14864 (66.12)	7.50 (12.08)	1900	2.81		8th Gear		187 (86.1)	71 (21.7)	77 (25.0)	28.750 (97.084)
296.62 (221.19)	12462 (55.43)	8.93 (14.36)	1898	2.25		9th Gear		187 (85.8)	72 (22.2)	78 (25.6)	28.750 (97.084)

POWER AND FUEL CONSUMPTION AT 1700 RPM

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—812 rpm)								
332.83 (248.19)	1700	18.474 (69.932)	0.387 (0.235)	18.02 (3.549)	186 (85.6)	65 (18.1)	75 (23.7)	28.875 (97.507)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
283.67 (211.54)	19287 (85.79)	5.52 (8.88)	1700	4.25	18.451 (69.846)	0.453 (0.276)	15.37 (3.029)	186 (85.6)	68 (19.7)	74 (23.3)	28.920 (97.659)
MAXIMUM POWER IN SELECTED GEARS											
268.55 (200.26)	36034 (160.29)	2.79 (4.50)	1946	14.83		3rd Gear		181 (82.8)	62 (16.7)	64 (17.8)	28.930 (97.692)
274.24 (204.50)	32898 (146.34)	3.13 (5.03)	1702	9.40		4th Gear		183 (83.9)	66 (18.9)	70 (21.1)	28.940 (97.726)
280.33 (209.04)	27087 (120.49)	3.88 (6.25)	1700	6.22		5th Gear		189 (87.2)	74 (23.3)	81 (27.2)	28.740 (97.051)
284.11 (211.86)	22825 (101.53)	4.67 (7.51)	1701	4.82		6th Gear		187 (86.1)	73 (22.8)	80 (26.7)	28.740 (97.051)
290.08 (216.31)	19626 (87.30)	5.54 (8.92)	1703	4.03		7th Gear		188 (86.4)	70 (21.1)	75 (23.9)	28.760 (97.118)
289.88 (216.16)	16226 (72.17)	6.70 (10.78)	1702	3.22		8th Gear		188 (86.4)	71 (21.7)	76 (24.4)	28.760 (97.118)
285.20 (212.67)	13427 (59.72)	7.97 (12.82)	1698	2.56		9th Gear		188 (86.7)	72 (22.2)	78 (25.6)	28.750 (97.084)
284.16 (211.90)	11033 (49.08)	9.66 (15.54)	1701	1.90		10th Gear		188 (86.7)	72 (22.2)	79 (26.1)	28.740 (97.051)

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 148°F *(64.3°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1455.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Steiger Panther CP-1360 Diesel

TRACTOR SOUND LEVEL WITH CAB	1700 RPM dB(A)	1900 RPM dB(A)	2100 RPM dB(A)
Maximum Available Power—Two Hours	73.5	73.5	74.5
75% of Pull at Maximum Power—Ten Hours			76.0
50% of Pull at Maximum Power—Two Hours			73.5
50% of Pull at Reduced Engine Speed—Two Hours			73.5
Bystander in 12th gear			93.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*
Ballast	—Liquid (each inner)	1930 lb *(875 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		19.5 in *(495 mm)*	19.5 in *(495 mm)*
Static Weight with Operator	—Rear	16540 lb *(7503 kg)*	16540 lb *(7503 kg)*
	Front	22580 lb *(10242 kg)*	18720 lb *(8491 kg)*
	Total	39120 lb *(17745 kg)*	35260 lb *(15994 kg)*

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1456 — STEIGER PANTHER KP-1360 DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—Two Hours (PTO Speed—1002 rpm)

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
326.12 (243.19)	2100	18.738 (71.007)	0.401 (0.244)	17.39 (3.425)	178 (81.4)	74 (23.1)	74 (23.4)	28.410 (95.936)

VARYING POWER AND FUEL CONSUMPTION—Two Hours

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
282.76 (210.85)	2142	17.005 (64.371)	0.419 (0.255)	16.63 (3.276)	176 (79.7)	74 (23.1)	75 (23.9)	....
0.00 (0.00)	2272	4.792 (18.140)	....	....	168 (75.8)	74 (23.1)	74 (23.6)	....
144.40 (107.68)	2188	11.210 (42.434)	0.541 (0.329)	12.88 (2.538)	171 (77.2)	74 (23.3)	75 (23.9)	....
325.93 (243.05)	2100	18.747 (70.965)	0.401 (0.244)	17.39 (3.425)	180 (81.9)	74 (23.3)	75 (23.9)	....
73.51 (54.82)	2224	7.863 (29.765)	0.746 (0.454)	9.35 (1.842)	160 (76.1)	74 (23.3)	75 (23.9)	....
214.71 (160.11)	2168	13.955 (52.825)	0.453 (0.276)	15.39 (3.031)	172 (77.8)	72 (22.5)	74 (23.6)	....
Av 173.55 *Av (129.42)*	**2182**	**12.262** *(46.417)*	**0.493** *(0.300)*	**14.15** *(2.788)*	**173** *(78.1)*	**74** *(23.1)*	**75** *(23.8)*	**28.378** *(95.822)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
289.10 (215.58)	15622 (69.49)	6.94 (11.17)	2100	2.93	18.712 (70.834)	0.451 (0.275)	15.45 (3.043)	178 (80.8)	57 (13.9)	64 (17.5)	29.005 (97.946)
75% of Pull at Maximum Power—Ten Hours 7th Gear											
227.19 (169.41)	11827 (52.61)	7.20 (11.59)	2162	2.03	15.923 (60.277)	0.489 (0.297)	14.27 (2.811)	175 (79.2)	52 (10.8)	61 (16.2)	28.919 (97.655)
50% of Pull at Maximum Power—Two Hours 7th Gear											
154.34 (115.09)	7885 (35.07)	7.34 (11.81)	2190	1.38	12.708 (48.105)	0.574 (0.349)	12.15 (2.393)	172 (77.8)	44 (6.7)	49 (9.2)	29.085 (98.216)
50% of Pull at Reduced Engine Speed—Two Hours 10th Gear											
154.37 (115.12)	7885 (35.07)	7.34 (11.81)	1280	1.34	10.199 (38.606)	0.461 (0.280)	15.14 (2.982)	173 (78.3)	44 (6.7)	50 (9.7)	29.080 (98.199)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %				Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
251.75 (187.73)	36771 (163.56)	2.57 (4.13)	2110	14.81		2nd Gear		174 (78.6)	38 (3.3)	40 (4.4)	29.200 (98.604)
275.83 (205.68)	31776 (141.34)	3.26 (5.24)	2099	8.48		3rd Gear		175 (79.4)	44 (6.7)	50 (10.0)	29.200 (98.604)
284.09 (211.84)	26472 (117.75)	4.02 (6.48)	2099	5.92		4th Gear		174 (78.6)	50 (10.0)	55 (12.8)	28.970 (97.827)
288.73 (215.31)	22107 (98.34)	4.90 (7.88)	2098	4.43		5th Gear		174 (78.9)	50 (10.0)	55 (12.8)	28.970 (97.827)
289.26 (215.70)	18507 (82.32)	5.86 (9.43)	2099	3.62		6th Gear		175 (79.2)	49 (9.4)	54 (12.2)	28.960 (97.794)
291.14 (217.10)	15769 (70.14)	6.92 (11.14)	2100	2.97		7th Gear		175 (79.4)	50 (10.0)	54 (12.2)	28.990 (97.895)
286.86 (213.92)	12863 (57.22)	8.36 (13.46)	2100	2.47		8th Gear		174 (78.9)	50 (10.0)	54 (12.2)	28.980 (97.861)

LUGGING ABILITY IN 7th GEAR

Crankshaft Speed rpm	2100	1885	1678	1464	1258	1046
Pull—lbs (kN)	15769 (70.14)	18900 (84.07)	21686 (96.46)	24235 (107.80)	24120 (107.29)	22038 (98.03)
Increase in Pull %	0	20	38	54	53	40
Power—Hp (kW)	291.14 (217.10)	311.08 (231.98)	315.53 (235.29)	305.52 (227.82)	261.28 (194.84)	199.50 (148.76)
Speed—Mph (km/h)	6.92 (11.14)	6.17 (9.93)	5.46 (8.78)	4.73 (7.61)	4.06 (6.54)	3.39 (5.46)
Slip %	2.97	3.79	4.43	5.22	5.22	4.59

Department of Agricultural Engineering

Dates of Test: October 4 to 19, 1982

Manufacturer: STEIGER TRACTOR, INC., 406 Main Avenue, Fargo, North Dakota 58126

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8376 **Fuel weight** 6.974 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SF **To motor** 8.408 gal *(31.827 l)* **Drained from motor** 7.630 gal *(28.883 l)* **Transmission and hydraulic lubricant** SAE 10 hydraulic transmission fluid **Final drive lubricant** SAE 85W-90 **Total time engine was operated** 71.0 hours.

ENGINE: Make Cummins Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** 11059658 **Crankshaft** lengthwise **Rated rpm** 1700 to 2100 **Bore and stroke** 5.5" × 6.0" *(139.7 mm × 152.4 mm)* **Compression ratio** 14.1 to 1 **Displacement** 855 cu in *(14011 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** one full flow cartridge and one bypass cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper cartridges **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type four wheel drive with duals **Serial No.** P36000507- **Tread width** rear 79" *(2007 mm)* to 136.4" *(3464 mm)* front 79" *(2007 mm)* to 136.4" *(3464 mm)* **Wheel base** 141.5" *(3594 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 75.5" *(1918 mm)* Vertical distance above roadway 45.4" *(1153 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph (km/h)** first 2.4 *(3.9)* second 2.9 *(4.7)* third 3.4 *(5.5)* fourth 4.1 *(6.6)* fifth 4.9 *(7.9)* sixth 5.8 *(9.3)* seventh 6.8 *(10.9)* eighth 8.2 *(13.2)* ninth 9.6 *(15.4)* tenth 11.6 *(18.7)* eleventh 14.0 *(22.5)* twelfth 16.5 *(26.5)* reverse 3.0 *(4.8)*, 5.1 *(8.2)* **Clutch** multiple wet disc hydraulically power actuated and operated by foot pedal **Brakes** dual caliper disc hydraulically operated by foot pedal or mechanically by hand lever **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 276" *(7.01 m)* left 276" *(7.01 m)* **Turning space diameter** (on concrete surface without brake) right 581.5" *(14.77 m)* left 581.5" *(14.77 m)* **Power take-off** 1002 rpm at 2100 engine rpm.

SUPPLEMENTARY TESTS

POWER AND FUEL CONSUMPTION AT 1900 RPM

POWER TAKE-OFF PERFORMANCE

MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—One Hour (PTO Speed—907 rpm)

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
347.12 (258.85)	1900	18.831 (71.283)	0.378 (0.230)	18.43 (3.631)	180 (82.2)	74 (23.2)	75 (23.9)	28.395 (95.886)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
308.01 (229.68)	18501 (82.30)	6.24 (10.05)	1901	3.42	18.820 (71.241)	0.426 (0.259)	16.37 (3.224)	180 (82.2)	57 (13.9)	69 (20.3)	29.025 (98.013)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %				Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
272.34 (203.09)	36697 (163.24)	2.78 (4.48)	1929	14.81		3rd Gear		175 (79.2)	42 (5.6)	47 (8.3)	29.200 (98.604)
295.65 (220.47)	31135 (138.49)	3.56 (5.73)	1901	8.04		4th Gear		177 (80.3)	48 (8.9)	55 (12.8)	29.200 (98.604)
301.76 (225.02)	25809 (114.80)	4.38 (7.06)	1901	5.53		5th Gear		175 (79.4)	50 (10.0)	55 (12.8)	28.970 (97.827)
305.10 (227.51)	21733 (96.67)	5.26 (8.47)	1901	4.51		6th Gear		175 (79.4)	50 (10.0)	54 (12.2)	28.960 (97.794)
312.41 (232.96)	18826 (83.74)	6.22 (10.02)	1900	3.70		7th Gear		175 (79.4)	50 (10.0)	54 (12.2)	28.980 (97.861)
308.80 (230.27)	15381 (68.42)	7.53 (12.12)	1900	2.81		8th Gear		176 (80.0)	50 (10.0)	54 (12.2)	28.970 (97.827)
304.73 (227.23)	12755 (56.73)	8.96 (14.42)	1899	2.31		9th Gear		175 (79.4)	50 (10.0)	54 (12.2)	28.970 (97.827)

POWER AND FUEL CONSUMPTION AT 1700 RPM

POWER TAKE-OFF PERFORMANCE

MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—One Hour (PTO Speed—811 rpm)

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
349.67 (260.75)	1700	18.482 (69.962)	0.369 (0.224)	18.92 (3.727)	182 (83.4)	73 (22.9)	75 (23.9)	28.395 (95.886)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
309.59 (230.86)	20929 (93.09)	5.55 (8.93)	1701	4.11	18.730 (70.902)	0.422 (0.257)	16.53 (3.256)	180 (82.2)	57 (13.6)	68 (20.0)	29.045 (98.081)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %				Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
271.94 (202.79)	36621 (162.90)	2.78 (4.48)	1929	14.81		3rd Gear		175 (79.4)	43 (6.1)	49 (9.4)	29.200 (98.604)
288.63 (215.23)	35396 (157.45)	3.06 (4.92)	1700	11.86		4th Gear		176 (80.0)	46 (7.8)	53 (11.7)	29.200 (98.604)
299.46 (223.31)	29077 (129.34)	3.86 (6.22)	1699	7.07		5th Gear		176 (80.0)	50 (10.0)	55 (12.8)	28.970 (97.827)
306.55 (228.60)	24614 (109.49)	4.67 (7.52)	1702	5.22		6th Gear		176 (80.0)	50 (10.0)	54 (12.2)	28.970 (97.827)
316.04 (235.67)	21417 (95.27)	5.53 (8.91)	1700	4.43		7th Gear		176 (79.7)	50 (10.0)	54 (12.2)	28.980 (97.861)
314.70 (234.67)	17587 (78.23)	6.71 (10.80)	1702	3.38		8th Gear		176 (80.0)	50 (10.0)	54 (12.2)	28.970 (97.827)
312.53 (233.05)	14656 (65.20)	8.00 (12.87)	1700	2.64		9th Gear		177 (80.3)	50 (10.0)	54 (12.2)	28.960 (97.794)

REPAIRS and ADJUSTMENTS: During preliminary drawbar tests, the circuit breaker in the transmission control circuit was found to be of the wrong amperage. It was replaced with one of proper amperage and test continued.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump inlet was maintained at 116°F *(46.7°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1456.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Steiger Panther KP-1360 Diesel

TRACTOR SOUND LEVEL WITH CAB	1700 RPM dB(A)	1900 RPM dB(A)	2100 RPM dB(A)
Maximum Available Power—Two Hours	74.0	73.5	73.5
75% of Pull at Maximum Power—Ten Hours			76.0
50% of Pull at Maximum Power—Two Hours			74.5
50% of Pull at Reduced Engine Speed—Two Hours			73.0
Bystander in 12th gear			94.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*
Ballast	—Liquid (each inner)	2043 lb *(928 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		19.5 in *(495 mm)*	19.5 in *(495 mm)*
Static Weight with Operator	—Rear	16640 lb *(7548 kg)*	16640 lb *(7548 kg)*
	Front	22930 lb *(10401 kg)*	18840 lb *(8546 kg)*
	Total	39570 lb *(17949 kg)*	35480 lb *(16094 kg)*

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1457
JOHN DEERE 4050 POWERSHIFT DIESEL
15 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1002 rpm)								
100.95 (75.28)	2200	6.692 (25.332)	0.463 (0.281)	15.08 (2.972)	186 (85.7)	60 (15.3)	75 (23.9)	29.080 (98.199)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
87.86 (65.52)	2249	6.089 (23.049)	0.484 (0.294)	14.43 (2.843)	183 (83.9)	59 (15.0)	75 (23.9)	....
0.00 (0.00)	2353	2.533 (9.588)	....	....	171 (77.2)	60 (15.3)	74 (23.6)	....
44.87 (33.46)	2298	4.145 (15.691)	0.645 (0.392)	10.83 (2.132)	178 (80.8)	58 (14.7)	74 (23.6)	....
101.32 (75.55)	2200	6.665 (25.230)	0.459 (0.279)	15.20 (2.994)	186 (85.8)	59 (15.0)	75 (23.9)	....
22.71 (16.93)	2327	3.393 (12.844)	1.042 (0.634)	6.70 (1.318)	174 (78.6)	60 (15.3)	76 (24.2)	....
66.47 (49.57)	2260	5.061 (19.158)	0.531 (0.323)	13.13 (2.587)	181 (82.8)	60 (15.8)	76 (24.7)	....
Av 53.87 **Av (40.17)**	**2283**	**4.647** **(17.591)**	**0.602** **(0.366)**	**11.59** **(2.284)**	**179** **(81.6)**	**59** **(15.2)**	**75** **(24.0)**	**29.055** **(98.114)**

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
83.95 (62.60)	5334 (23.73)	5.90 (9.50)	2200	4.32	6.665 (25.229)	0.554 (0.337)	12.60 (2.481)	184 (84.2)	47 (8.3)	58 (14.2)	28.850 (97.422)
75% of Pull at Maximum Power—Ten Hours 10th Gear											
67.04 (49.99)	4132 (18.38)	6.08 (9.79)	2248	3.41	5.733 (21.702)	0.597 (0.363)	11.69 (2.304)	179 (81.8)	51 (10.3)	53 (11.5)	28.931 (97.696)
50% of Pull at Maximum Power—Two Hours 10th Gear											
45.63 (34.04)	2755 (12.25)	6.22 (10.02)	2275	2.52	4.730 (17.904)	0.723 (0.440)	9.65 (1.901)	174 (78.9)	43 (5.8)	43 (6.1)	28.470 (96.139)
50% of Pull at Reduced Engine Speed—Two Hours 13th Gear											
45.62 (34.02)	2755 (12.25)	6.21 (9.99)	1389	2.44	3.440 (13.021)	0.526 (0.320)	13.26 (2.613)	175 (79.2)	49 (9.2)	49 (9.4)	28.300 (95.565)
MAXIMUM POWER IN SELECTED GEARS											
71.16 (53.06)	11058 (49.19)	2.41 (3.88)	2224	14.61	4th Gear			178 (81.1)	34 (1.1)	41 (5.0)	29.090 (98.283)
80.02 (59.67)	10695 (47.57)	2.81 (4.52)	2198	12.73	5th Gear			181 (82.5)	34 (1.1)	40 (4.4)	29.100 (98.266)
85.10 (63.46)	9653 (42.94)	3.31 (5.32)	2200	9.42	5th Gear			181 (82.5)	35 (1.7)	42 (5.6)	29.060 (98.131)
87.11 (64.96)	8370 (37.23)	3.90 (6.28)	2198	7.16	7th Gear			184 (84.2)	38 (3.3)	46 (7.8)	28.910 (97.625)
84.30 (62.86)	7124 (31.69)	4.44 (7.14)	2199	5.78	8th Gear			182 (83.3)	37 (2.8)	44 (6.7)	28.910 (97.625)
84.37 (62.92)	6135 (27.29)	5.16 (8.30)	2198	4.95	9th Gear			181 (82.8)	35 (1.7)	40 (4.4)	28.910 (97.625)
86.43 (64.45)	5509 (24.51)	5.88 (9.47)	2199	4.43	10th Gear			182 (83.1)	34 (1.1)	42 (5.5)	29.050 (98.097)
84.66 (63.14)	4650 (20.68)	6.83 (10.99)	2199	3.85	11th Gear			184 (84.4)	43 (6.0)	49 (9.4)	28.910 (97.625)
88.75 (66.18)	4226 (18.80)	7.88 (12.67)	2200	3.41	12th Gear			184 (84.4)	43 (6.1)	51 (10.6)	28.910 (97.625)
86.07 (64.18)	3287 (14.62)	9.82 (15.81)	2200	2.59	13th Gear			184 (84.2)	45 (7.2)	53 (11.7)	28.890 (97.557)

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2199	1980	1761	1543	1318	1104	887
Pull—lbs. (kN)	5509 (24.51)	6050 (26.91)	6513 (28.98)	6943 (30.88)	7210 (32.07)	7310 (32.52)	7071 (31.45)
Increase in Pull %	0	10	18	26	31	33	28
Power—Hp (kW)	86.43 (64.45)	85.07 (63.44)	81.16 (60.52)	75.42 (56.24)	66.68 (49.72)	56.55 (42.17)	43.96 (32.78)
Speed—Mph (km/h)	5.88 (9.47)	5.27 (8.49)	4.67 (7.52)	4.07 (6.56)	3.47 (5.58)	2.90 (4.66)	2.33 (3.75)
Slip %	4.43	4.93	5.36	5.78	6.06	6.20	6.20

Department of Agricultural Engineering

Dates of Test: October 12 to November 11, 1982

Manufacturer: JOHN DEERE TRACTOR WORKS, P.O. Box 270, Waterloo, Iowa 50702

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8379 **Fuel weight** 6.977 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 3.853 gal *(14.585 l)* **Drained from motor** 3.722 gal *(14.088 l)* **Transmission and hydraulic lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 48.5 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical **Serial No.** *RG6466D230839* **Crankshaft** lengthwise **Rated rpm** 2000 to 2200 **Bore and stroke** 4.57" × 4.75" *(116.0 mm × 120.6 mm)* **Compression ratio** 17.0 to 1 **Displacement** 466 cu in *(7636 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge and prestrainer **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: Type standard with duals **Serial No.** *RW4050P001133* **Tread width** rear 60.0" *(1524 mm)* to 114" *(2890 mm)* front 56" *(1420 mm)* to 82.6" *(2099 mm)* **Wheel base** 106.7" *(2710 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 30.0" *(762 mm)* Vertical distance above roadway 43.0" *(1092 mm)* Horizontal distance from center of rear wheel tread 0.4" *(10 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph (km/h)** first 1.2 *(2.0)* second 1.8 *(2.9)* third 2.1 *(3.4)* fourth 2.7 *(4.4)* fifth 3.1 *(5.1)* sixth 3.6 *(5.7)* seventh 4.1 *(6.6)* eighth 4.6 *(7.4)* ninth 5.3 *(8.5)* tenth 6.0 *(9.7)* eleventh 6.9 *(11.1)* twelfth 8.0 *(12.8)* thirteenth 9.8 *(15.8)* fourteenth 13.4 *(21.6)* fifteenth 16.6 *(26.7)* reverse 1.5 *(2.4)*, 2.2 *(3.5)*, 3.3 *(5.4)*, 5.0 *(8.0)* **Clutch** wet multiple disc hydraulically power actuated and operated by foot pedal **Brakes** wet disc hydraulically power actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 146" *(3.7 m)* left 146" *(3.7 m)* (on concrete surface without brake) right 157" *(4.0 m)* left 157" *(4.0 m)* **Turning space diameter** (on concrete surface with brake applied) right 295.8" *(7.51 m)* left 295.8" *(7.51 m)* (on concrete surface without brake) right 326.9" *(8.30 m)* left 326.9" *(8.30 m)* **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

TRACTOR SOUND LEVEL WITH CAB	2000 RPM dB(A)	2200 RPM dB(A)
Maximum Available Power—Two Hours	74.0	73.5
75% of Pull at Maximum Power—Ten Hours		74.0
50% of Pull at Maximum Power—Two Hours		73.0
50% of Pull at Reduced Engine Speed—Two Hours		70.0
Bystander in 15th gear		88.0

SUPPLEMENTAL TESTS
POWER AND FUEL CONSUMPTION AT 2000 RPM
POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—912 rpm)								
100.83 (75.19)	2000	6.338 (23.992)	0.439 (0.267)	15.91 (3.134)	188 (86.7)	59 (15.2)	76 (24.2)	29.075 (98.182)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
84.21 (62.79)	5912 (26.30)	5.34 (8.60)	2000	4.65	6.360 (24.076)	0.527 (0.321)	13.24 (2.608)	186 (85.3)	48 (8.6)	59 (14.7)	28.815 (97.304)
MAXIMUM POWER IN SELECTED GEARS											
85.47 (63.73)	9133 (40.62)	3.51 (5.65)	2000	8.17	7th Gear			185 (84.7)	40 (4.4)	48 (8.9)	28.910 (97.625)
86.05 (64.17)	6051 (26.91)	5.33 (8.58)	2003	5.00	10th Gear			182 (83.3)	33 (0.6)	40 (4.4)	29.040 (98.064)
88.33 (65.87)	4640 (20.64)	7.14 (11.49)	2002	3.70	12th Gear			185 (85.0)	44 (6.7)	52 (11.1)	28.900 (97.591)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Four 18.4-34; 6; 12 (85)	Four 18.4-34; 6; 12 (85)
Ballast	—Liquid (each)	None	None
	—Test Equip. (each)	50 lb (23 kg)	None
Front Tires	—No., size, ply & psi (kPa)	Two 10.00-16; 6; 32 (220)	Two 10.00-16; 6; 32 (220)
Ballast	—Liquid (each)	None	None
	—Test Equip. (each)	55 lb (25 kg)	None
Height of Drawbar		22.5 in (570 mm)	22.5 in (570 mm)
Static Weight with Operator	—Rear	9370 lb (4250 kg)	9170 lb (4160 kg)
	Front	3660 lb (1660 kg)	3550 lb (1610 kg)
	Total	13030 lb (5910 kg)	12720 lb (5770 kg)

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 113°F *(45.0°C)*. Ten gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1457.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
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Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

John Deere 4050 Powershift Diesel

NEBRASKA TRACTOR TEST 1458
JOHN DEERE 4250 POWERSHIFT DIESEL
15 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1002 rpm)								
120.86 *(90.13)*	2200	7.658 *(28.989)*	0.442 *(0.269)*	15.78 *(3.109)*	188 *(86.8)*	58 *(14.7)*	76 *(24.2)*	28.863 *(97.467)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
104.22 *(77.72)*	2234	6.954 *(26.324)*	0.465 *(0.283)*	14.99 *(2.952)*	185 *(85.0)*	60 *(15.6)*	76 *(24.4)*	......
0.00 *(0.00)*	2334	2.499 *(9.460)*	......	......	173 *(78.3)*	60 *(15.6)*	75 *(23.9)*	......
53.29 *(39.74)*	2285	4.670 *(17.678)*	0.611 *(0.372)*	11.41 *(2.248)*	182 *(83.1)*	60 *(15.6)*	74 *(23.3)*	......
121.20 *(90.38)*	2200	7.706 *(29.170)*	0.444 *(0.270)*	15.73 *(3.098)*	188 *(86.9)*	59 *(15.0)*	74 *(23.6)*	......
26.97 *(20.11)*	2302	3.569 *(13.510)*	0.923 *(0.562)*	7.56 *(1.489)*	176 *(80.0)*	59 *(15.0)*	74 *(23.3)*	......
79.21 *(59.07)*	2262	5.831 *(22.073)*	0.514 *(0.312)*	13.58 *(2.676)*	184 *(84.4)*	61 *(16.1)*	76 *(24.7)*	......
Av 64.15 *Av (47.84)*	2270	5.205 *(19.703)*	0.566 *(0.344)*	12.33 *(2.428)*	181 *(82.5)*	60 *(15.4)*	75 *(23.9)*	28.840 *(97.388)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
101.39 *(75.60)*	6085 *(26.98)*	6.27 *(10.09)*	2201	4.40	7.544 *(28.556)*	0.519 *(0.316)*	13.44 *(2.648)*	187 *(85.8)*	42 *(5.6)*	48 *(8.9)*	29.320 *(99.009)*
75% of Pull at Maximum Power—Ten Hours 10th Gear											
80.05 *(59.69)*	4639 *(20.64)*	6.47 *(10.41)*	2233	3.00	6.626 *(25.083)*	0.577 *(0.351)*	12.08 *(2.380)*	184 *(84.2)*	47 *(8.2)*	56 *(13.3)*	29.153 *(98.445)*
50% of Pull at Maximum Power—Two Hours 10th Gear											
54.47 *(40.62)*	3092 *(13.75)*	6.61 *(10.63)*	2278	2.61	5.358 *(20.281)*	0.686 *(0.417)*	10.17 *(2.003)*	184 *(84.2)*	49 *(9.2)*	59 *(14.7)*	29.185 *(98.553)*
50% of Pull at Reduced Engine Speed—Two Hours 13th Gear											
54.57 *(40.69)*	3092 *(13.75)*	6.62 *(10.65)*	1394	2.57	3.996 *(15.126)*	0.511 *(0.311)*	13.66 *(2.690)*	179 *(81.7)*	50 *(10.0)*	61 *(15.8)*	29.155 *(98.452)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
87.11 *(64.96)*	12802 *(56.94)*	2.55 *(4.11)*	2227	14.97	4th Gear	183 *(83.6)*	37 *(2.8)*	40 *(4.4)*	29.280 *(98.874)*
97.15 *(72.45)*	12167 *(54.12)*	2.99 *(4.82)*	2200	12.41	5th Gear	184 *(84.4)*	40 *(4.4)*	44 *(6.7)*	29.280 *(98.874)*
100.47 *(74.92)*	10742 *(47.78)*	3.51 *(5.64)*	2200	9.62	6th Gear	186 *(85.6)*	47 *(8.3)*	55 *(12.8)*	29.260 *(98.807)*
102.67 *(76.56)*	9307 *(41.40)*	4.14 *(6.66)*	2199	7.52	7th Gear	186 *(85.3)*	47 *(8.3)*	55 *(12.8)*	29.270 *(98.840)*
100.86 *(75.21)*	8039 *(35.76)*	4.71 *(7.57)*	2198	5.91	8th Gear	187 *(86.1)*	46 *(7.8)*	54 *(12.2)*	29.280 *(98.874)*
101.18 *(75.45)*	6929 *(30.82)*	5.48 *(8.81)*	2197	5.09	9th Gear	188 *(86.7)*	46 *(7.8)*	54 *(12.2)*	29.280 *(98.874)*
103.26 *(77.00)*	6185 *(27.51)*	6.26 *(10.08)*	2199	4.48	10th Gear	187 *(86.1)*	45 *(7.2)*	52 *(11.1)*	29.300 *(98.942)*
102.24 *(76.24)*	5996 *(23.3[illegible])*	7.25 *(11.67)*	2200	3.86	11th Gear	187 *(85.6)*	47 *(8.3)*	56 *(13.3)*	29.260 *(98.807)*
105.11 *(78.38)*	4716 *(20.98)*	8.36 *(13.45)*	2199	3.55	12th Gear	186 *(85.3)*	47 *(8.3)*	56 *(13.3)*	29.260 *(98.807)*

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2199	1973	1764	1542	1316	1098
Pull—lbs *(kN)*	6185 *(27.51)*	7098 *(31.57)*	7779 *(34.60)*	8207 *(36.51)*	8123 *(36.13)*	7379 *(32.82)*
Increase in Pull %	0	15	[illegible]	33	31	19
Power—Hp *(kW)*	103.26 *(77.00)*	105.50 *(78.67)*	[illegible]	94.29 *(70.31)*	79.76 *(59.47)*	60.75 *(45.30)*
Speed—Mph *(km/h)*	6.26 *(10.08)*	5.57 *(8.97)*	4.95 *(7.97)*	4.31 *(6.93)*	3.68 *(5.93)*	3.09 *(4.97)*
Slip %	4.48	5.09	5.69	6.13	5.99	5.54

Department of Agricultural Engineering

Dates of Test: October 11-26, 1982

Manufacturer: JOHN DEERE TRACTOR WORKS, P.O. Box 270, Waterloo, Iowa 50702

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8378 **Fuel weight** 6.976 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 3.797 gal *(14.374 l)* **Drained from motor** 3.689 gal *(13.966 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 45.5 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6466T230592* **Crankshaft** lengthwise **Rated rpm** 2000 to 2200 **Bore and stroke** 4.57" × 4.75" *(116.0 mm × 120.6 mm)* **Compression ratio** 15.8 to 1 **Displacement** 466 cu in *(7636 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements with prestrainer **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: Type standard with duals **Serial No.** *RW4250P001044* **Tread width** rear 60" *(1524 mm)* to 114" *(2890 mm)* front 56" *(1420 mm)* to 82.6" *(2099 mm)* **Wheel base** 106.7" *(2710 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 29.5" *(749 mm)* Vertical distance above roadway 45.0" *(1143 mm)* Horizontal distance from center of rear wheel tread 0.4" *(10 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph (km/h)** first 1.4 *(2.2)* second 2.0 *(3.2)* third 2.3 *(3.7)* fourth 3.0 *(4.8)* fifth 3.4 *(5.5)* sixth 3.9 *(6.3)* seventh 4.5 *(7.2)* eighth 5.0 *(8.1)* ninth 5.8 *(9.3)* tenth 6.6 *(10.6)* eleventh 7.6 *(12.2)* twelfth 8.7 *(14.0)* thirteenth 10.8 *(17.3)* fourteenth 14.7 *(23.6)* fifteenth 18.2 *(29.3)* reverse 1.7 *(2.7)*, 2.4 *(3.9)*, 3.6 *(5.9)*, 5.5 *(8.8)* **Clutch** wet multiple disc hydraulically power actuated and operated by foot pedal **Brakes** wet disc hydraulically power actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 146" *(3.7 m)* left 146" *(3.7 m)* (on concrete surface without brake) right 157" *(4.0 m)* left 157" *(4.0 m)* **Turning space diameter** (on concrete surface with brake applied) right 302" *(7.67 m)* left 302" *(7.67 m)* (on concrete surface without brake) right 338" *(8.58 m)* left 338" *(8.58 m)* **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

TRACTOR SOUND LEVEL WITH CAB	2000 RPM dB(A)	2200 RPM dB(A)
Maximum Available Power—Two Hours	74.0	74.5
75% of Pull at Maximum Power—Ten Hours		74.5
50% of Pull at Maximum Power—Two Hours		74.5
50% of Pull at Reduced Engine Speed—Two Hours		71.5
Bystander in 15th gear		86.0

SUPPLEMENTAL TESTS
POWER AND FUEL CONSUMPTION AT 2000 RPM
POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—911 rpm)								
123.32 *(91.96)*	2000	7.361 *(27.864)*	0.416 *(0.253)*	16.75 *(3.300)*	189 *(87.1)*	59 *(14.8)*	76 *(24.4)*	28.850 *(97.422)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
103.66 *(77.30)*	6917 *(30.77)*	5.62 *(9.04)*	1999	5.09	7.508 *(28.420)*	0.505 *(0.307)*	13.81 *(2.720)*	188 *(86.4)*	45 *(6.9)*	51 *(10.6)*	29.255 *(98.790)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
103.19 *(76.95)*	10476 *(46.60)*	3.69 *(5.94)*	2001	9.14	7th Gear	187 *(86.1)*	47 *(8.3)*	55 *(12.8)*	29.270 *(98.840)*
104.61 *(78.01)*	6940 *(30.87)*	5.65 *(9.10)*	1999	5.01	10th Gear	188 *(86.4)*	46 *(7.8)*	53 *(11.7)*	29.290 *(98.908)*
107.71 *(80.32)*	5340 *(23.75)*	7.56 *(12.17)*	2000	3.94	12th Gear	187 *(86.1)*	47 *(8.3)*	56 *(13.3)*	29.250 *(98.773)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 18.4-38; 6; 12 *(83)*	Four 18.4-38; 6; 12 *(83)*
Ballast	—Liquid (each inner)	522 lb *(237 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 11.00-16; 8; 36 *(250)*	Two 11.00-16; 8; 36 *(250)*
Ballast	—Liquid (each)	None	None
	—Test Equip. (each)	35 lb *(16 kg)*	None
Height of Drawbar		24.5 in *(623 mm)*	24.5 in *(623 mm)*
Static Weight with Operator	—Rear	11110 lb *(5039 kg)*	10065 lb *(4566 kg)*
	Front	3860 lb *(1751 kg)*	3790 lb *(1719 kg)*
	Total	14970 lb *(6790 kg)*	13855 lb *(6285 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 114°F *(45.4°C)*. Nine gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1458.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

John Deere 4250 Powershift Diesel

NEBRASKA TRACTOR TEST 1459
JOHN DEERE 4450 POWERSHIFT DIESEL
15 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—1002 rpm)									
	140.43 *(104.72)*	2200	8.694 *(32.910)*	0.432 *(0.263)*	16.15 *(3.182)*	188 *(86.9)*	62 *(16.8)*	75 *(23.8)*	28.837 *(97.377)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
	122.44 *(91.30)*	2256	7.945 *(30.075)*	0.453 *(0.275)*	15.41 *(3.036)*	184 *(84.2)*	60 *(15.6)*	74 *(23.3)*	....
	0.00 *(0.00)*	2334	2.562 *(9.698)*	....	....	170 *(76.7)*	59 *(15.0)*	74 *(23.1)*	....
	62.38 *(46.52)*	2300	5.181 *(19.612)*	0.580 *(0.353)*	12.04 *(2.372)*	180 *(82.2)*	59 *(15.0)*	74 *(23.3)*	....
	141.95 *(105.85)*	2200	8.736 *(33.069)*	0.429 *(0.261)*	16.25 *(3.201)*	188 *(86.9)*	60 *(15.6)*	74 *(23.3)*	....
	31.37 *(23.39)*	2314	3.844 *(14.551)*	0.855 *(0.520)*	8.16 *(1.607)*	173 *(78.3)*	59 *(15.0)*	74 *(23.3)*	....
	92.50 *(68.98)*	2274	6.561 *(24.836)*	0.495 *(0.301)*	14.10 *(2.777)*	183 *(83.9)*	59 *(15.0)*	74 *(23.3)*	....
Av *Av*	75.11 *(56.01)*	2280	5.805 *(21.974)*	0.539 *(0.328)*	12.94 *(2.549)*	180 *(82.1)*	59 *(15.2)*	74 *(23.3)*	28.880 *(97.523)*

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
117.46 *(87.59)*	7134 *(31.73)*	6.17 *(9.94)*	2200	4.10	8.616 *(32.616)*	0.512 *(0.311)*	13.63 *(2.686)*	184 *(84.4)*	55 *(12.5)*	61 *(15.8)*	28.675 *(96.831)*
75% of Pull at Maximum Power—Ten Hours 10th Gear											
94.34 *(70.35)*	5457 *(24.27)*	6.48 *(10.43)*	2287	3.16	7.499 *(28.385)*	0.555 *(0.337)*	12.58 *(2.478)*	179 *(81.5)*	33 *(0.5)*	38 *(3.4)*	29.150 *(98.435)*
50% of Pull at Maximum Power—Two Hours 10th Gear											
64.00 *(47.73)*	3638 *(16.18)*	6.60 *(10.62)*	2300	2.12	6.037 *(22.852)*	0.658 *(0.400)*	10.60 *(2.088)*	178 *(80.8)*	47 *(8.1)*	54 *(11.9)*	28.945 *(97.743)*
50% of Pull at Reduced Engine Speed—Two Hours 13th Gear											
63.86 *(47.62)*	3638 *(16.18)*	6.55 *(10.59)*	1442	2.20	4.586 *(17.359)*	0.501 *(0.305)*	13.92 *(2.743)*	177 *(80.5)*	43 *(5.8)*	48 *(8.9)*	28.980 *(97.861)*
MAXIMUM POWER IN SELECTED GEARS											
100.25 *(74.76)*	15014 *(66.79)*	2.50 *(4.03)*	2251	14.13	4th Gear			179 *(81.7)*	50 *(10.0)*	52 *(11.1)*	28.730 *(97.017)*
111.19 *(82.91)*	14361 *(63.88)*	2.90 *(4.67)*	2199	11.48	5th Gear			182 *(83.1)*	52 *(11.1)*	56 *(13.3)*	28.710 *(96.949)*
117.53 *(87.64)*	13005 *(57.85)*	3.39 *(5.45)*	2200	9.02	6th Gear			183 *(83.6)*	54 *(12.2)*	59 *(15.0)*	28.700 *(96.916)*
118.97 *(88.72)*	11156 *(49.62)*	4.00 *(6.44)*	2201	6.77	7th Gear			185 *(84.7)*	54 *(12.2)*	58 *(14.4)*	28.690 *(96.882)*
117.28 *(87.45)*	9449 *(42.03)*	4.65 *(7.49)*	2200	5.53	8th Gear			185 *(85.0)*	54 *(12.2)*	60 *(15.6)*	28.690 *(96.882)*
117.58 *(87.68)*	8151 *(36.26)*	5.41 *(8.71)*	2200	4.56	9th Gear			184 *(84.4)*	54 *(12.2)*	60 *(15.6)*	28.680 *(96.848)*
119.78 *(89.32)*	7276 *(32.36)*	6.17 *(9.94)*	2201	4.10	10th Gear			184 *(84.4)*	54 *(12.2)*	60 *(15.6)*	28.670 *(96.814)*
117.04 *(87.28)*	6132 *(27.28)*	7.16 *(11.52)*	2201	3.49	11th Gear			181 *(82.8)*	44 *(6.7)*	46 *(7.8)*	28.900 *(97.591)*
121.94 *(90.93)*	5695 *(25.33)*	8.03 *(12.92)*	2200	3.18	12th Gear			181 *(82.8)*	45 *(7.2)*	48 *(8.9)*	28.910 *(97.625)*

Department of Agricultural Engineering

Dates of Test: October 13 to November 4, 1982

Manufacturer: JOHN DEERE TRACTOR WORKS, P.O. Box 270, Waterloo, Iowa 50702

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8381 **Fuel weight** 6.978 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 3.664 gal *(13.870 l)* **Drained from motor** 3.468 gal *(13.129 l)* **Transmission and hydraulic lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 70.0 hours.

ENGINE: **Make** John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6466T230932* **Crankshaft** lengthwise **Rated rpm** 2000 to 2200 **Bore and stroke** 4.57" × 4.75" *(116.0 mm × 120.6 mm)* **Compression ratio** 15.8 to 1 **Displacement** 466 cu in *(7636 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements with prestrainer **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: **Type** standard with duals **Serial No.** *RW4450P001406* **Tread width** rear 60.0" *(1524 mm)* to 130" *(3300 mm)* front 58" *(1470 mm)* to 82.6" *(2099 mm)* **Wheel base** 106.7" *(2710 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 28.0" *(711 mm)* Vertical distance above roadway 41.9" *(1064 mm)* Horizontal distance from center of rear wheel tread 0.5" *(13 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph *(km/h)*** first 1.4 *(2.2)* second 2.0 *(3.2)* third 2.3 *(3.7)* fourth 3.0 *(4.8)* fifth 3.4 *(5.5)* sixth 3.9 *(6.3)* seventh 4.5 *(7.2)* eighth 5.0 *(8.1)* ninth 5.8 *(9.3)* tenth 6.6 *(10.6)* eleventh 7.6 *(12.2)* twelfth 8.7 *(14.0)* thirteenth 10.8 *(17.3)* fourteenth 14.7 *(23.6)* fifteenth 18.2 *(29.3)* reverse 1.7 *(2.7)*, 2.4 *(3.9)*, 3.6 *(5.9)*, 5.5 *(8.8)* **Clutch** wet multiple disc hydraulically power actuated and operated by foot pedal **Brakes** wet disc hydraulically power actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 146" *(3.7 m)* left 146" *(3.7 m)* (on concrete surface without brake) right 157" *(4.0 m)* left 157" *(4.0 m)* **Turning space diameter** (on concrete surface with brake applied) right 302" *(7.67 m)* left 302" *(7.67 m)* (on concrete surface without brake) right 338" *(8.58 m)* left 338" *(8.58 m)* **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

SUPPLEMENTAL TESTS
DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES
POWER AND FUEL CONSUMPTION AT 2200 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
118.71 *(88.52)*	6737 *(29.97)*	6.61 *(10.63)*	2200	2.33	8.688 *(32.888)*	0.511 *(0.311)*	13.66 *(2.692)*	189 *(87.2)*	53 *(11.7)*	66 *(18.9)*	28.900 *(97.591)*
MAXIMUM POWER IN SELECTED GEARS											
94.39 *(70.39)*	16154 *(71.85)*	2.19 *(3.53)*	2267	10.59	3rd Gear			182 *(83.1)*	49 *(9.4)*	57 *(13.9)*	28.630 *(96.679)*
115.13 *(85.85)*	15916 *(70.80)*	2.71 *(4.37)*	2201	9.33	4th Gear			184 *(84.2)*	49 *(9.4)*	57 *(13.9)*	28.640 *(96.713)*
118.62 *(88.45)*	13760 *(61.21)*	3.23 *(5.20)*	2201	6.07	5th Gear			185 *(84.7)*	50 *(10.0)*	58 *(14.4)*	28.620 *(96.645)*
121.14 *(90.33)*	12210 *(54.31)*	3.72 *(5.99)*	2199	4.99	6th Gear			189 *(87.2)*	60 *(15.6)*	71 *(21.7)*	28.530 *(96.342)*
122.09 *(91.05)*	10578 *(47.05)*	4.33 *(6.97)*	2199	4.04	7th Gear			189 *(87.2)*	59 *(15.0)*	69 *(20.6)*	28.540 *(96.375)*
119.75 *(89.29)*	8956 *(39.84)*	5.01 *(8.07)*	2200	3.07	8th Gear			190 *(87.5)*	57 *(13.9)*	67 *(19.4)*	28.560 *(96.443)*
119.40 *(89.03)*	7704 *(34.27)*	5.81 *(9.35)*	2200	2.74	9th Gear			190 *(87.8)*	56 *(13.3)*	67 *(19.4)*	28.570 *(96.477)*
120.27 *(89.68)*	6837 *(30.41)*	6.60 *(10.62)*	2199	2.41	10th Gear			189 *(87.2)*	56 *(13.3)*	67 *(19.4)*	28.580 *(96.510)*
118.67 *(88.49)*	5826 *(25.91)*	7.64 *(12.29)*	2199	2.08	11th Gear			191 *(88.1)*	60 *(15.6)*	71 *(21.7)*	28.530 *(96.342)*
122.51 *(91.36)*	5355 *(23.82)*	8.58 *(13.81)*	2200	1.91	12th Gear			191 *(88.3)*	60 *(15.6)*	71 *(21.7)*	28.520 *(96.308)*

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2199	1980	1761	1537	1321	1110
Pull—lbs *(kN)*	6837 *(30.41)*	7892 *(35.11)*	8500 *(37.81)*	8884 *(39.52)*	9007 *(40.07)*	8070 *(35.90)*
Increase in Pull %	0	15	24	30	32	18
Power—Hp *(kW)*	120.27 *(89.68)*	124.40 *(92.77)*	118.91 *(88.67)*	108.25 *(80.72)*	94.28 *(70.30)*	71.22 *(53.11)*
Speed—Mph *(km/h)*	6.60 *(10.62)*	5.91 *(9.51)*	5.25 *(8.44)*	4.57 *(7.35)*	3.93 *(6.32)*	3.31 *(5.33)*
Slip %	2.41	2.91	3.07	3.23	3.30	3.07

POWER AND FUEL CONSUMPTION AT 2000 RPM
POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—911 rpm)								
144.35 *(107.64)*	2000	8.497 *(32.165)*	0.411 *(0.250)*	16.99 *(3.346)*	189 *(87.2)*	61 *(16.3)*	75 *(23.7)*	28.855 *(97.439)*

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
124.05 *(92.49)*	7774 *(34.58)*	5.98 *(9.63)*	2001	2.86	8.527 *(32.277)*	0.480 *(0.292)*	14.55 *(2.865)*	190 *(87.5)*	53 *(11.7)*	62 *(16.4)*	29.025 *(98.283)*
MAXIMUM POWER IN SELECTED GEARS											
125.59 *(93.65)*	12047 *(53.59)*	3.91 *(6.29)*	2003	4.75	7th Gear			192 *(88.6)*	59 *(15.0)*	70 *(21.1)*	28.540 *(96.375)*
125.42 *(93.52)*	7852 *(34.93)*	5.99 *(9.64)*	2001	2.74	10th Gear			190 *(87.8)*	56 *(13.3)*	67 *(19.4)*	28.570 *(96.477)*
128.10 *(95.52)*	6173 *(27.46)*	7.78 *(12.52)*	1999	2.08	12th Gear			192 *(88.6)*	60 *(15.6)*	71 *(21.7)*	28.520 *(96.308)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 122°F *(50.0°C)*. Nine gears were chosen between stability limit and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1459.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

John Deere 4450 Powershift Diesel

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2201	1982	1765	1540	1323	1099
Pull—lbs *(kN)*	7276 *(32.36)*	8374 *(37.25)*	9125 *(40.59)*	9401 *(41.82)*	9130 *(40.61)*	8594 *(38.23)*
Increase in Pull %	0	15	25	29	25	18
Power—Hp *(kW)*	119.78 *(89.32)*	123.44 *(92.05)*	119.11 *(88.82)*	106.85 *(79.68)*	89.09 *(66.43)*	70.05 *(52.23)*
Speed—Mph *(km/h)*	6.17 *(9.94)*	5.53 *(8.90)*	4.89 *(7.88)*	4.26 *(6.86)*	3.66 *(5.89)*	3.06 *(4.92)*
Slip %	4.10	4.63	5.23	5.38	5.38	4.93

TRACTOR SOUND LEVEL WITH CAB	Radial Ply 2000 RPM dB(A)	Radial Ply 2200 RPM dB(A)	Bias Ply 2200 RPM dB(A)
Maximum Available Power—Two Hours	74.5	74.5	74.0
75% of Pull at Maximum Power—Ten Hours			74.0
50% of Pull at Maximum Power—Two Hours			74.0
50% of Pull at Reduced Engine Speed—Two Hours			72.0
Bystander in 15th gear			86.0

TIRES, BALLAST AND WEIGHT		Bias Ply Tires With Ballast	Bias Ply Tires Without Ballast	Radial Ply Tires With Ballast	Radial Ply Tires Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 18.4-38; 6; 14 *(95)*	Four 18.4-38; 6; 14 *(95)*	Inner Two 18.4R38; 8; 12 *(85)* Outer Two 18.4R38; 6; 12 *(85)*	Inner Two 18.4R38; 8; 12 *(85)* Outer Two 18.4R38; 6; 12 *(85)*
Ballast	—Liquid (each inner)	858 lb *(389 kg)*	None	572 lb *(260 kg)*	None
	—Cast Iron (each)	None	None	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 11.00-16; 8; 40 *(275)*	Two 11.00-16; 8; 40 *(275)*	Two 11.00-16; 8; 40 *(275)*	Two 11.00-16; 8; 40 *(275)*
Ballast	—Liquid (each)	None	None	None	None
	—Test Equip. (each)	40 lb *(18 kg)*	None	40 lb *(18 kg)*	None
Height of Drawbar		22 in *(560 mm)*	22 in *(560 mm)*	20.5 in *(520 mm)*	20.5 in *(520 mm)*
Static Weight with Operator	—Rear	12875 lb *(5840 kg)*	11160 lb *(5062 kg)*	12745 lb *(5781 kg)*	11600 lb *(5262 kg)*
	Front	3870 lb *(1755 kg)*	3790 lb *(1719 kg)*	3880 lb *(1760 kg)*	3800 lb *(1724 kg)*
	Total	16745 lb *(7595 kg)*	14950 lb *(6781 kg)*	16625 lb *(7541 kg)*	15400 lb *(6985 kg)*

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1460
JOHN DEERE 4650 POWERSHIFT DIESEL
15 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—998 rpm)								
165.52 (123.43)	2200	9.761 (36.949)	0.411 (0.250)	16.96 (3.341)	184 (84.4)	61 (15.9)	73 (23.8)	28.990 (97.895)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
143.77 (107.21)	2249	8.819 (33.384)	0.428 (0.260)	16.30 (3.211)	181 (82.8)	62 (16.4)	76 (24.2)	......
0.00 (0.00)	2338	2.601 (9.846)	....	....	167 (75.0)	60 (15.6)	74 (23.3)	......
73.44 (54.76)	2297	5.676 (21.486)	0.539 (0.328)	12.94 (2.549)	176 (80.3)	60 (15.6)	74 (23.3)	......
165.38 (123.32)	2200	9.799 (37.093)	0.413 (0.252)	16.88 (3.325)	186 (85.3)	62 (16.4)	76 (24.4)	......
37.04 (27.62)	2316	4.132 (15.641)	0.778 (0.474)	8.96 (1.766)	170 (76.7)	62 (16.4)	76 (24.2)	......
108.94 (81.24)	2271	7.340 (27.785)	0.470 (0.286)	14.84 (2.924)	180 (81.9)	60 (15.6)	74 (23.3)	......
Av 88.10 Av (65.70)	2279	6.595 (24.966)	0.506 (0.308)	13.78 (2.714)	177 (80.3)	61 (16.1)	75 (23.9)	28.985 (97.872)

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
137.31 (102.39)	8250 (36.70)	6.24 (10.05)	2200	4.12	9.639 (36.487)	0.490 (0.298)	14.25 (2.806)	187 (85.8)	65 (18.3)	74 (23.3)	28.760 (97.118)
75% of Pull at Maximum Power—Ten Hours 10th Gear											
109.42 (81.60)	6345 (28.22)	6.47 (10.41)	2266	3.49	8.324 (31.509)	0.531 (0.323)	13.15 (2.590)	178 (80.8)	41 (5.1)	42 (5.6)	28.834 (97.368)
50% of Pull at Maximum Power—Two Hours 10th Gear											
74.57 (55.61)	4231 (18.82)	6.61 (10.64)	2290	2.43	6.593 (24.958)	0.617 (0.375)	11.31 (2.228)	175 (79.4)	33 (0.6)	36 (1.9)	29.210 (98.638)
50% of Pull at Reduced Engine Speed—Two Hours 15th Gear											
74.79 (55.77)	4231 (18.82)	6.63 (10.67)	1437	2.43	5.214 (19.735)	0.486 (0.296)	14.35 (2.826)	175 (79.2)	36 (2.2)	41 (5.0)	29.235 (98.722)
MAXIMUM POWER IN SELECTED GEARS											
127.27 (94.91)	16746 (74.49)	2.85 (4.59)	2222	14.78		5th Gear		181 (82.5)	39 (3.9)	45 (7.2)	29.230 (98.705)
136.66 (101.91)	15138 (67.34)	3.39 (5.45)	2200	10.05		6th Gear		184 (84.4)	62 (16.7)	70 (21.1)	28.770 (97.152)
141.05 (105.16)	13171 (58.59)	4.02 (6.46)	2199	7.41		7th Gear		185 (85.0)	61 (16.1)	68 (20.0)	28.780 (97.186)
138.12 (103.00)	11040 (49.11)	4.69 (7.55)	2201	5.72		8th Gear		185 (85.0)	60 (15.6)	66 (18.9)	28.780 (97.186)
137.98 (102.89)	9472 (42.13)	5.46 (8.79)	2202	4.85		9th Gear		184 (84.4)	58 (14.4)	64 (17.8)	28.780 (97.186)
140.62 (104.86)	8460 (37.63)	6.23 (10.03)	2200	4.04		10th Gear		182 (83.3)	55 (12.8)	60 (15.6)	28.790 (97.220)
139.47 (104.00)	7220 (32.12)	7.24 (11.66)	2198	3.47		11th Gear		185 (85.0)	63 (17.2)	71 (21.7)	28.770 (97.152)
143.33 (106.88)	6621 (29.45)	8.12 (13.06)	2200	3.22		12th Gear		185 (84.7)	64 (17.8)	73 (22.8)	28.770 (97.152)

Department of Agricultural Engineering

Dates of Test: October 9-28, 1982

Manufacturer: JOHN DEERE TRACTOR WORKS, P.O. Box 270, Waterloo, Iowa 50702

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8379 **Fuel weight** 6.977 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 4.601 gal *(17.415 l)* **Drained from motor** 4.253 gal *(16.099 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 60.5 hours.

ENGINE: **Make** John Deere Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** *RG6466A231034* **Crankshaft** lengthwise **Rated rpm** 2000 to 2200 **Bore and stroke** 4.57" × 4.75" *(116.0 mm × 120.6 mm)* **Compression ratio** 15.8 to 1 **Displacement** 466 cu in *(7636 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements with prestrainer **Muffler** vertical **Cooling medium temperature control** three thermostats and variable speed fan.

CHASSIS: **Type** standard with duals **Serial No.** *RW4650P001183* **Tread width** rear 63" *(1600 mm)* to 130" *(3300 mm)* front 60.2" *(1530 mm)* to 86.3" *(2192 mm)* **Wheel base** 118.5" *(3010 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 31.5" *(800 mm)* Vertical distance above roadway 45.3" *(1151 mm)* Horizontal distance from center of rear wheel tread 0.3" *(8 mm)* to the right **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.3 *(2.1)* second 1.9 *(3.1)* third 2.3 *(3.7)* fourth 2.9 *(4.7)* fifth 3.3 *(5.3)* sixth 3.8 *(6.1)* seventh 4.3 *(7.0)* eighth 5.0 *(8.0)* ninth 5.7 *(9.2)* tenth 6.5 *(10.5)* eleventh 7.5 *(12.0)* twelfth 8.4 *(13.5)* thirteenth 10.4 *(16.7)* fourteenth 14.5 *(23.4)* fifteenth 18.0 *(29.0)* reverse 1.8 *(2.9)*, 2.6 *(4.2)*, 4.0 *(6.4)*, 6.0 *(9.7)* **Clutch** wet multiple disc hydraulically power actuated and operated by foot pedal **Brakes** wet disc hydraulically power actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 165" *(4.2 m)* left 165" *(4.2 m)* (on concrete surface without brake) right 181" *(4.6 m)* left 181" *(4.6 m)* **Turning space diameter** (on concrete surface with brake applied) right 346" *(8.79 m)* left 346" *(8.79 m)* (on concrete surface without brake) right 380" *(9.65 m)* left 380" *(9.65 m)* **Power take-off** 998 rpm at 2200 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

SUPPLEMENTAL TESTS
DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES
POWER AND FUEL CONSUMPTION AT 2200 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
140.48 (104.76)	8052 (35.82)	6.54 (10.53)	2201	1.90	9.728 (36.826)	0.483 (0.294)	14.44 (2.845)	182 (83.3)	49 (9.4)	59 (14.7)	29.115 (98.317)
MAXIMUM POWER IN SELECTED GEARS											
127.06 (94.75)	18794 (83.60)	2.54 (4.08)	2221	14.64		4th Gear		179 (81.4)	43 (6.1)	50 (10.0)	29.050 (98.097)
142.05 (105.93)	16586 (73.78)	3.21 (5.17)	2190	5.30		5th Gear		183 (83.9)	56 (13.3)	70 (21.1)	29.060 (98.131)
145.80 (108.73)	14787 (65.77)	3.70 (5.95)	2202	4.15		6th Gear		185 (85.0)	57 (13.9)	70 (21.1)	29.060 (98.131)
145.69 (108.64)	12723 (56.59)	4.29 (6.91)	2200	3.14		7th Gear		186 (85.6)	57 (13.9)	70 (21.1)	29.060 (98.131)
141.88 (105.80)	10651 (47.38)	4.97 (8.00)	2201	2.46		8th Gear		186 (85.3)	57 (13.9)	70 (21.1)	29.070 (98.165)
141.47 (105.49)	9232 (41.06)	5.75 (9.25)	2199	2.03		9th Gear		185 (85.0)	57 (13.9)	69 (20.6)	29.080 (98.199)
143.07 (106.68)	8205 (36.50)	6.54 (10.52)	2199	1.86		10th Gear		184 (84.4)	54 (12.2)	65 (18.3)	29.110 (98.300)
140.74 (104.95)	6980 (31.05)	7.56 (12.17)	2200	1.51		11th Gear		185 (85.0)	56 (13.3)	70 (21.1)	29.060 (98.131)
146.06 (108.92)	6465 (28.76)	8.47 (13.64)	2200	1.42		12th Gear		185 (84.7)	56 (13.3)	70 (21.1)	29.060 (98.131)

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2199	1981	1762	1535	1323	1092
Pull—lbs (kN)	8205 (36.50)	9252 (41.15)	10072 (44.80)	10604 (47.17)	10227 (45.49)	8657 (38.51)
Increase in Pull %	0	13	23	29	25	6
Power—Hp (kW)	143.07 (106.68)	144.90 (108.05)	140.04 (104.43)	128.20 (95.60)	106.61 (79.50)	74.74 (55.73)
Speed—Mph (km/h)	6.54 (10.52)	5.87 (9.45)	5.21 (8.39)	4.53 (7.30)	3.91 (6.29)	3.24 (5.21)
Slip %	1.86	2.12	2.29	2.46	2.46	2.12

POWER AND FUEL CONSUMPTION AT 2000 RPM
POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—907 rpm)								
168.59 (125.72)	2000	9.420 (35.659)	0.390 (0.237)	17.90 (3.526)	183 (83.7)	61 (15.9)	75 (23.8)	28.985 (97.878)

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
144.10 (107.46)	9121 (40.57)	5.93 (9.54)	2001	2.25	9.331 (35.320)	0.461 (0.281)	15.12 (2.978)	182 (83.1)	47 (8.1)	54 (12.2)	29.020 (97.996)
MAXIMUM POWER IN SELECTED GEARS											
147.50 (109.99)	14250 (63.39)	3.88 (6.25)	2000	3.57		7th Gear		186 (85.6)	57 (13.9)	70 (21.1)	29.060 (98.131)
145.22 (108.29)	9185 (40.85)	5.93 (9.54)	1999	1.94		10th Gear		186 (85.3)	56 (13.3)	68 (20.0)	29.080 (98.199)
148.86 (111.00)	7265 (32.32)	7.68 (12.37)	2000	1.60		12th Gear		184 (84.4)	56 (13.3)	70 (21.1)	29.060 (98.131)

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 120°F *(48.6°C)*. Eight gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1460.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

John Deere 4650 Powershift Diesel

LUGGING ABILITY IN 10th GEAR						
Crankshaft Speed rpm	2200	1986	1765	1543	1312	1096
Pull—lbs *(kN)*	8460 *(37.63)*	9532 *(42.40)*	10375 *(46.15)*	11066 *(49.22)*	10792 *(48.01)*	9081 *(40.39)*
Increase in Pull %	0	13	23	31	28	7
Power—Hp *(kW)*	140.62 *(104.86)*	141.88 *(105.80)*	136.62 *(101.88)*	126.93 *(94.65)*	105.31 *(78.53)*	74.86 *(55.82)*
Speed—Mph *(km/h)*	6.23 *(10.03)*	5.58 *(8.98)*	4.94 *(7.95)*	4.30 *(6.92)*	3.66 *(5.89)*	3.09 *(4.98)*
Slip %	4.04	4.85	5.32	5.64	5.64	4.53

	Radial Ply		Bias Ply
	2000 RPM	2200 RPM	2200 RPM
TRACTOR SOUND LEVEL WITH CAB	dB(A)	dB(A)	dB(A)
Maximum Available Power—Two Hours	75.5	76.5	76.5
75% of Pull at Maximum Power—Ten Hours			76.0
50% of Pull at Maximum Power—Two Hours			77.0
50% of Pull at Reduced Engine Speed—Two Hours			73.5
Bystander in 15th gear			88.0

		Bias Ply Tires		Radial Ply Tires	
TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**	**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Four 20.8-38; 10; 14 *(95)*	Four 20.8-38; 10; 14 *(95)*	Four 20.8R38; 10; 12 *(85)*	Four 20.8R38; 10; 12 *(85)*
Ballast	—Liquid (each inner)	500 lb *(227 kg)*	None	310 lb *(141 kg)*	None
	—Cast Iron (each)	None	None	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 14L-16.1; 10; 44 *(305)*	Two 14L-16.1; 10; 44 *(305)*	Two 14L-16.1; 10; 44 *(305)*	Two 14L-16.1; 10; 44 *(305)*
Ballast	—Liquid (each)	None	None	None	None
	—Test Equip. (each)	38 lb *(17 kg)*	None	38 lb *(17 kg)*	None
Height of Drawbar		24.5 in *(620 mm)*	24.5 in *(620 mm)*	24.5 in *(620 mm)*	24.5 in *(620 mm)*
Static Weight with Operator—Rear		14650 lb *(6645 kg)*	13650 lb *(6192 kg)*	14710 lb *(6672 kg)*	14090 lb *(6391 kg)*
Front		5010 lb *(2273 kg)*	4935 lb *(2239 kg)*	5030 lb *(2282 kg)*	4955 lb *(2248 kg)*
Total		19660 lb *(8918 kg)*	18585 lb *(8430 kg)*	19740 lb *(8954 kg)*	19045 lb *(8639 kg)*

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1461
JOHN DEERE 4850 POWERSHIFT DIESEL
15 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—998 rpm)								
192.99 (143.91)	2200	11.046 (41.814)	0.399 (0.243)	17.47 (3.442)	194 (90.1)	59 (15.1)	73 (22.7)	29.223 (98.683)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
166.58 (124.22)	2233	9.883 (37.411)	0.414 (0.252)	16.86 (3.320)	188 (86.7)	58 (14.2)	72 (21.9)	....
0.00 (0.00)	2333	2.579 (9.763)	....	....	172 (77.5)	57 (13.9)	71 (21.7)	....
85.18 (63.52)	2288	6.211 (23.511)	0.509 (0.310)	13.71 (2.702)	183 (83.9)	60 (15.3)	74 (23.3)	....
191.94 (143.13)	2199	11.059 (41.787)	0.401 (0.244)	17.39 (3.425)	196 (91.1)	60 (15.8)	76 (24.4)	....
43.00 (32.07)	2302	4.518 (17.102)	0.733 (0.446)	9.52 (1.875)	176 (80.3)	62 (16.4)	76 (24.2)	....
126.56 (94.38)	2263	8.068 (30.541)	0.445 (0.271)	15.69 (3.090)	185 (85.0)	60 (15.3)	74 (23.1)	....
Av 102.21 **Av (76.22)**	**2270**	**7.050** **(26.687)**	**0.481** **(0.293)**	**14.50** **(2.856)**	**183** **(84.1)**	**59** **(15.2)**	**74** **(23.2)**	**29.240** **(98.739)**

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
162.53 (121.20)	9875 (43.92)	6.17 (9.93)	2199	4.54	11.069 (41.900)	0.475 (0.289)	14.68 (2.892)	188 (86.7)	49 (9.4)	56 (13.1)	28.690 (96.882)
75% of Pull at Maximum Power—Ten Hours 10th Gear											
127.90 (95.37)	7496 (33.34)	6.40 (10.30)	2249	3.31	9.267 (35.080)	0.506 (0.308)	13.80 (2.719)	183 (83.6)	49 (9.6)	58 (14.2)	28.762 (97.125)
50% of Pull at Maximum Power—Two Hours 10th Gear											
87.52 (65.26)	4998 (22.23)	6.57 (10.57)	2287	2.26	7.290 (27.595)	0.581 (0.354)	12.01 (2.365)	176 (79.7)	38 (3.1)	42 (5.3)	28.805 (97.270)
50% of Pull at Reduced Engine Speed—Two Hours 13th Gear											
87.54 (65.28)	4997 (22.23)	6.57 (10.57)	1434	2.26	5.857 (22.171)	0.467 (0.284)	14.95 (2.944)	179 (81.[illegible])	43 (6.9)	53 (11.7)	28.803 (97.270)
MAXIMUM POWER IN SELECTED GEARS											
142.44 (106.22)	18709 (83.50)	2.84 (4.58)	2231	14.95	5th Gear			184 (84.4)	47 (8.3)	50 (10.0)	28.680 (96.848)
158.79 (118.41)	17935 (79.78)	3.32 (5.34)	2200	11.18	6th Gear			184 (84.4)	48 (8.9)	51 (10.6)	28.690 (96.882)
165.73 (123.58)	15745 (70.04)	3.95 (6.35)	2200	8.26	7th Gear			188 (86.7)	48 (8.9)	52 (11.1)	28.700 (96.916)
162.86 (121.44)	13168 (58.57)	4.64 (7.46)	2199	6.22	8th Gear			191 (88.3)	51 (10.6)	60 (15.6)	28.640 (96.713)
163.35 (121.81)	11342 (50.45)	5.40 (8.69)	2199	5.21	9th Gear			192 (88.9)	51 (10.6)	59 (15.0)	28.650 (96.747)
164.65 (122.78)	9994 (44.45)	6.18 (9.94)	2200	4.42	10th Gear			188 (86.4)	49 (9.4)	57 (13.9)	28.670 (96.814)
165.23 (123.21)	8664 (38.54)	7.15 (11.51)	2197	3.94	11th Gear			190 (87.8)	51 (10.6)	61 (16.1)	28.640 (96.713)
171.27 (127.72)	7988 (35.53)	8.04 (12.94)	2198	3.53	12th Gear			191 (88.3)	51 (10.6)	61 (16.1)	28.640 (96.713)

Department of Agricultural Engineering

Dates of Test: October 11 to November 11, 1982

Manufacturer: JOHN DEERE TRACTOR WORKS, P.O. Box 270, Waterloo, Iowa 50702

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° *(15°/15°)*** 0.8382 **Fuel weight** 6.979 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 4.759 gal *(18.014 l)* **Drained from motor** 4.211 gal *(15.941 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 67.5 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** *RG6466A231046* **Crankshaft** lengthwise **Rated rpm** 1700 to 2200 **Bore and stroke** 4.57" × 4.75" *(116.0 mm × 120.6 mm)* **Compression ratio** 15.0 to 1 **Displacement** 466 cu in *(7636 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements with prestrainer **Muffler** vertical **Cooling medium temperature control** three thermostats and variable speed fan.

CHASSIS: Type standard with duals **Serial No.** *RW4850P001113* **Tread width** rear 63" *(1600 mm)* to 130" *(3300 mm)* front 60.2" *(1530 mm)* to 86.3" *(2192 mm)* **Wheel base** 118.5" *(3010 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 31.9" *(810 mm)* Vertical distance above roadway 45.3" *(1151 mm)* Horizontal distance from center of rear wheel tread 0.3" *(8 mm)* to the right **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph *(km/h)*** first 1.3 *(2.1)* second 1.9 *(3.1)* third 2.3 *(3.7)* fourth 2.9 *(4.7)* fifth 3.3 *(5.3)* sixth 3.8 *(6.1)* seventh 4.3 *(7.0)* eighth 5.0 *(8.0)* ninth 5.7 *(9.2)* tenth 6.5 *(10.5)* eleventh 7.5 *(12.0)* twelfth 8.4 *(13.5)* thirteenth 10.4 *(16.7)* fourteenth 14.5 *(23.4)* fifteenth 18.0 *(29.0)* reverse 1.8 *(2.9)*, 2.6 *(4.2)*, 4.0 *(6.4)*, 6.0 *(9.7)* **Clutch** wet multiple disc hydraulically power actuated and operated by foot pedal **Brakes** wet disc hydraulically power actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 165" *(4.2 m)* left 165" *(4.2 m)* (on concrete surface without brake) right 181" *(4.6 m)* left 181" *(4.6 m)* **Turning space diameter** (on concrete surface with brake applied) right 346" *(8.79 m)* left 346" *(8.79 m)* (on concrete surface without brake) right 380" *(9.65 m)* left 380" *(9.65 m)* **Power take-off** 998 rpm at 2200 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

SUPPLEMENTAL TESTS
DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES
POWER AND FUEL CONSUMPTION AT 2200 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
164.73 (122.84)	9482 (42.18)	6.52 (10.49)	2201	2.20	11.033 (41.765)	0.467 (0.284)	14.93 (2.941)	185 (85.0)	42 (5.3)	44 (6.4)	29.005 (97.946)
MAXIMUM POWER IN SELECTED GEARS											
149.37 (111.38)	20810 (92.57)	2.69 (4.33)	2236	10.00	4th Gear			182 (83.1)	40 (4.4)	41 (5.0)	28.980 (97.861)
161.81 (120.66)	19252 (85.63)	3.15 (5.07)	2200	7.07	5th Gear			183 (83.9)	40 (4.4)	42 (5.6)	28.990 (97.895)
171.05 (127.56)	17568 (78.15)	3.65 (5.88)	2200	5.08	6th Gear			183 (83.9)	39 (3.9)	41 (5.0)	29.010 (97.962)
172.60 (128.71)	15179 (67.52)	4.26 (6.86)	2199	3.68	7th Gear			185 (84.7)	39 (3.9)	41 (5.0)	29.000 (97.929)
166.57 (124.21)	12634 (56.20)	4.94 (7.96)	2198	2.93	8th Gear			187 (86.1)	39 (3.9)	41 (5.0)	29.000 (97.929)
165.25 (123.23)	10810 (48.09)	5.73 (9.23)	2200	2.33	9th Gear			186 (85.3)	39 (3.9)	42 (5.6)	29.010 (97.962)
167.10 (124.61)	9607 (42.73)	6.52 (10.50)	2200	1.99	10th Gear			187 (85.8)	38 (3.3)	41 (5.0)	29.010 (97.962)
166.11 (123.87)	8258 (36.73)	7.54 (12.14)	2202	1.73	11th Gear			188 (86.4)	38 (3.3)	41 (5.0)	29.000 (97.929)
171.85 (128.15)	7630 (33.94)	8.45 (13.59)	2200	1.55	12th Gear			186 (85.6)	38 (3.3)	41 (5.0)	29.000 (97.929)

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2200	1984	1761	1538	1311	1108
Pull—lbs (kN)	9607 (42.73)	11119 (49.46)	12336 (54.87)	13058 (58.08)	11844 (52.68)	10234 (45.52)
Increase in Pull %	0	16	28	36	23	7
Power—Hp (kW)	167.10 (124.61)	173.77 (129.58)	170.57 (127.19)	157.34 (117.33)	122.02 (90.99)	89.46 (66.71)
Speed—Mph (km/h)	6.52 (10.50)	5.86 (9.43)	5.19 (8.34)	4.52 (7.27)	3.86 (6.22)	3.28 (5.28)
Slip %	1.99	2.33	2.67	3.01	2.67	2.16

POWER AND FUEL CONSUMPTION AT 2000 RPM
POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—907 rpm)								
199.94 (149.10)	2000	10.943 (41.424)	0.382 (0.232)	18.27 (3.599)	195 (90.7)	59 (15.2)	75 (23.8)	29.225 (98.688)

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 10th Gear											
172.11 (128.34)	10942 (48.67)	5.90 (9.49)	1999	2.59	11.033 (41.765)	0.447 (0.272)	15.60 (3.073)	189 (86.9)	43 (6.1)	47 (8.1)	28.970 (97.827)
MAXIMUM POWER IN SELECTED GEARS											
177.70 (132.51)	17411 (77.45)	3.83 (6.16)	1997	4.92	7th Gear			186 (85.3)	39 (3.9)	41 (5.0)	29.000 (97.929)
174.42 (130.06)	11074 (49.26)	5.91 (9.51)	1999	2.42	10th Gear			187 (86.1)	38 (3.3)	41 (5.0)	29.000 (97.929)
179.63 (133.95)	8787 (39.08)	7.67 (12.34)	2002	1.81	12th Gear			187 (86.1)	38 (3.3)	41 (5.0)	29.000 (97.929)

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 125°F *(51.7°C)*. Eight gears were chosen between 15% slip (bias ply tires), stability limit (radial ply tires) and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1461.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

John Deere 4850 Powershift Diesel

LUGGING ABILITY IN 10th GEAR

Crankshaft Speed rpm	2200	1983	1760	1538	1322	1103
Pull—lbs *(kN)*	9994 *(44.45)*	11432 *(50.85)*	12617 *(56.12)*	13213 *(58.77)*	12568 *(55.91)*	10413 *(46.32)*
Increase in Pull %	0	14	26	32	26	4
Power—Hp *(kW)*	164.65 *(122.78)*	168.35 *(123.54)*	163.90 *(122.22)*	149.46 *(111.45)*	122.55 *(91.38)*	85.70 *(63.91)*
Speed—Mph *(km/h)*	6.18 *(9.94)*	5.52 *(8.89)*	4.87 *(7.84)*	4.24 *(6.83)*	3.66 *(5.89)*	3.09 *(4.97)*
Slip %	4.42	5.21	5.84	6.15	5.84	4.90

TRACTOR SOUND LEVEL WITH CAB	RATED RPM	Radial Ply 1700 dB(A)	Radial Ply 2000 dB(A)	Radial Ply 2200 dB(A)	Bias Ply 2200 dB(A)
Maximum Available Power—Two Hours		74.5	74.0	73.5	75.5
75% of Pull at Maximum Power—Ten Hours					75.0
50% of Pull at Maximum Power—Two Hours					74.5
50% of Pull at Reduced Engine Speed—Two Hours					72.5
Bystander in 15th gear					87.5

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POWER AND FUEL CONSUMPTION AT 1700 RPM
POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Temperature °F (°C) Air wet bulb	Temperature °F (°C) Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—771 rpm)								
189.76 *(141.50)*	1700	10.110 *(38.271)*	0.372 *(0.226)*	18.77 *(3.692)*	199 *(92.7)*	60 *(15.7)*	75 *(23.7)*	29.220 *(98.672)*

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temp °F (°C) Cooling med	Temp °F (°C) Air wet bulb	Temp °F (°C) Air dry bulb	Barom inch Hg *(kPa)*
Maximum Available Power—Two Hours 10th Gear											
166.86 *(124.43)*	12532 *(55.75)*	4.99 *(8.04)*	1700	2.93	10.335 *(39.121)*	0.432 *(0.263)*	16.15 *(3.181)*	193 *(89.4)*	46 *(7.8)*	52 *(10.8)*	28.925 *(97.675)*
MAXIMUM POWER IN SELECTED GEARS											
166.47 *(124.13)*	19591 *(87.15)*	3.19 *(5.13)*	1700	6.99	7th Gear			187 *(85.8)*	39 *(3.9)*	41 *(5.0)*	29.010 *(97.962)*
167.80 *(125.13)*	12579 *(55.95)*	5.00 *(8.05)*	1701	2.84	10th Gear			188 *(86.4)*	38 *(3.3)*	41 *(5.0)*	29.000 *(97.929)*
172.34 *(128.96)*	9987 *(44.42)*	6.49 *(10.45)*	1700	2.07	12th Gear			186 *(85.6)*	38 *(3.3)*	41 *(5.0)*	29.000 *(97.929)*

TIRES, BALLAST AND WEIGHT		Bias Ply Tires With Ballast	Bias Ply Tires Without Ballast	Radial Ply Tires With Ballast	Radial Ply Tires Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 20.8-38; 10; 16 *(110)*	Four 20.8-38; 10; 16 *(110)*	Four 20.8R38; 10; 12 *(85)*	Four 20.8R38; 10; 12 *(85)*
Ballast	—Liquid (each inner)	1318 lb *(598 kg)*	None	1100 lb *(499 kg)*	None
	—Cast Iron (each)	None	None	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 14L-16.1; 10; 44 *(305)*	Two 14L-16.1; 10; 44 *(305)*	Two 14L-16.1; 10; 44 *(305)*	Two 14L-16.1; 10; 44 *(305)*
Ballast	—Liquid (each)	None	None	None	None
	—Test Equip. (each)	40 lb *(18 kg)*	None	40 lb *(18 kg)*	None
Height of Drawbar		24.5 in *(620 mm)*	24.5 in *(620 mm)*	23 in *(585 mm)*	23 in *(585 mm)*
Static Weight with Operator	—Rear	16385 lb *(7432 kg)*	13750 lb *(6237 kg)*	16390 lb *(7434 kg)*	14190 lb *(6437 kg)*
	Front	5050 lb *(2291 kg)*	4970 lb *(2254 kg)*	5050 lb *(2291 kg)*	4970 lb *(2254 kg)*
	Total	21435 lb *(9723 kg)*	18720 lb *(8491 kg)*	21440 lb *(9725 kg)*	19160 lb *(8691 kg)*

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1462 — VERSATILE 1150 DIESEL
8 SPEED

DRAWBAR PERFORMANCE AT 2100 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crankshaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Temp. °F (°C) Air wet bulb	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 4th (1-4) Gear											
390.69 *(291.34)*	24626 *(109.54)*	5.95 *(9.57)*	2102	3.52	24.665 *(93.360)*	0.440 *(0.268)*	15.84 *(3.121)*	174 *(78.9)*	36 *(1.9)*	44 *(6.7)*	28.820 *(97.321)*
75% of Pull at Maximum Power—Ten Hours 4th (1-4) Gear											
318.01 *(237.14)*	19015 *(84.58)*	6.27 *(10.09)*	2204	2.86	21.720 *(82.219)*	0.476 *(0.290)*	14.64 *(2.884)*	173 *(78.1)*	45 *(7.2)*	47 *(8.2)*	28.804 *(97.267)*
50% of Pull at Maximum Power—Two Hours 4th (1-4) Gear											
217.57 *(162.24)*	12677 *(56.39)*	6.44 *(10.36)*	2242	1.99	17.619 *(66.695)*	0.565 *(0.344)*	12.35 *(2.433)*	171 *(77.2)*	32 *(0.0)*	35 *(1.4)*	28.880 *(97.523)*
50% of Pull at Reduced Engine Speed—Two Hours 6th (2-2) Gear											
217.92 *(162.51)*	12678 *(56.39)*	6.45 *(10.37)*	1587	1.82	13.909 *(52.651)*	0.445 *(0.271)*	15.67 *(3.086)*	172 *(77.5)*	42 *(5.5)*	51 *(10.5)*	28.840 *(97.388)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crankshaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
354.07 *(264.03)*	43219 *(192.25)*	3.07 *(4.94)*	2147	14.50	2nd (1-2) Gear	175 *(79.2)*	44 *(6.7)*	54 *(12.2)*	28.820 *(97.321)*
396.17 *(295.43)*	31095 *(138.32)*	4.78 *(7.69)*	2098	4.78	3rd (1-3) Gear	176 *(79.7)*	41 *(5.0)*	50 *(10.0)*	28.870 *(97.490)*
400.29 *(298.50)*	25353 *(112.78)*	5.92 *(9.53)*	2097	3.76	4th (1-4) Gear	175 *(79.2)*	41 *(5.0)*	50 *(10.0)*	28.890 *(97.557)*
399.16 *(297.65)*	21807 *(97.00)*	6.86 *(11.05)*	2099	3.12	5th (2-1) Gear	174 *(78.6)*	41 *(5.0)*	50 *(10.0)*	28.880 *(97.523)*
393.77 *(293.63)*	17377 *(77.29)*	8.50 *(13.68)*	2103	2.31	6th (2-2) Gear	174 *(78.9)*	41 *(5.0)*	50 *(10.0)*	28.870 *(97.490)*

LUGGING ABILITY IN 4th (1-4) GEAR

Crankshaft Speed rpm	2097	1894	1689	1470	1267	1059
Pull—lbs *(kN)*	25353 *(112.78)*	29219 *(129.97)*	33429 *(148.70)*	36919 *(164.22)*	36885 *(164.07)*	36092 *(160.55)*
Increase in Pull %	0	15	32	46	45	42
Power—Hp *(kW)*	400.29 *(298.50)*	413.54 *(308.38)*	417.69 *(311.47)*	397.22 *(296.20)*	341.21 *(254.44)*	279.89 *(208.71)*
Speed—Mph *(km/h)*	5.92 *(9.53)*	5.31 *(8.54)*	4.60 *(7.34)*	4.03 *(6.49)*	3.47 *(5.58)*	2.91 *(4.68)*
Slip %	3.76	4.47	5.40	6.30	6.45	6.30

TRACTOR SOUND LEVEL WITH CAB	1700 RPM dB(A)	1900 RPM dB(A)	2100 RPM dB(A)
Maximum Available Power—Two Hours	79.5	81.0	81.5
75% of Pull at Maximum Power—Ten Hours			80.0
50% of Pull at Maximum Power—Two Hours			79.5
50% of Pull at Reduced Engine Speed—Two Hours			76.5
Bystander in 8th (2-4) gear			91.0

SUPPLEMENTARY TESTS
DRAWBAR PERFORMANCE AT 1900 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crankshaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Temp. °F (°C) Air wet bulb	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 4th (1-4) Gear											
402.73 *(300.32)*	28383 *(126.25)*	5.32 *(8.56)*	1901	4.43	24.358 *(92.206)*	0.422 *(0.257)*	16.53 *(3.257)*	174 *(78.6)*	41 *(4.7)*	48 *(8.6)*	28.815 *(97.306)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crankshaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
351.92 *(262.43)*	43052 *(191.50)*	3.07 *(4.95)*	2150	14.90	2nd (1-2) Gear	175 *(79.2)*	44 *(6.7)*	54 *(12.2)*	28.820 *(97.321)*
407.96 *(304.21)*	35870 *(159.56)*	4.26 *(6.86)*	1900	6.15	3rd (1-3) Gear	175 *(79.4)*	41 *(5.0)*	50 *(10.0)*	28.860 *(97.456)*
414.31 *(308.95)*	29206 *(129.91)*	5.32 *(8.56)*	1900	4.59	4th (1-4) Gear	174 *(78.6)*	41 *(5.0)*	50 *(10.0)*	28.880 *(97.523)*
414.81 *(309.32)*	25219 *(112.18)*	6.17 *(9.93)*	1897	3.00	5th (2-1) Gear	175 *(79.2)*	41 *(5.0)*	50 *(10.0)*	28.870 *(97.490)*
415.21 *(309.62)*	20385 *(90.68)*	7.64 *(12.29)*	1899	2.80	6th (2-2) Gear	175 *(79.2)*	41 *(5.0)*	50 *(10.0)*	28.870 *(97.490)*

Department of Agricultural Engineering

Dates of Test: November 11-19, 1982

Manufacturer: VERSATILE FARM EQUIPMENT CO., 1260 Clarence Avenue, Winnipeg, Manitoba Canada R3T 1T3

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8376 **Fuel weight** 6.974 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** SE-SF, CC-CD **To motor** 9.293 gal *(35.177 l)* **Drained from motor** 8.658 gal *(32.775 l)* **Transmission and hydraulic lubricant** Hydraul 56 fluid or equivalent **Final drive lubricant** SAE 85W-140 **Total time engine was operated** 35.5 hours.

ENGINE: Make Cummins Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** 31126712 **Crankshaft** lengthwise **Rated rpm** 1750 to 2100 **Bore and stroke** 6.25" × 6.25" *(158.8 mm × 158.8 mm)* **Compression ratio** 15.5 to 1 **Displacement** 1150 cu in *(18848 ml)* **Starting system** 24 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** one full flow cartridge and one bypass cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: Type four wheel drive with duals **Serial No.** 1150 82 201219 **Tread width** rear 83.1" *(2110 mm)* to 151" *(3836 mm)* front 83.1" *(2110 mm)* to 151" *(3836 mm)* **Wheel base** 140" *(3560 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 91.8" *(2333 mm)* Vertical distance above roadway 45" *(1143 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 3.0 *(4.8)* second 3.7 *(6.0)* third 5.3 *(8.5)* fourth 6.5 *(10.5)* fifth 7.4 *(12.0)* sixth 9.1 *(14.6)* seventh 13.0 *(20.9)* eighth 16.0 *(25.7)* reverse 3.5 *(5.6)*, 4.3 *(6.9)*, 6.1 *(9.8)*, 7.5 *(12.0)* **Clutch** multiple dry disc operated by foot pedal **Brakes** caliper disc hydraulically operated by foot pedal **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 257" *(6.53 m)* left 257" *(6.53 m)* **Turning space diameter** (on concrete surface without brake) right 575" *(14.61 m)* left 575" *(14.61 m)* **Power take-off** none.

REPAIRS and ADJUSTMENT: No repairs or adjustments.

DRAWBAR PERFORMANCE AT 1750 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crankshaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	Fuel Consumption lb/hp.hr (kg/kW.h)	Fuel Consumption Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Temp. °F (°C) Air wet bulb	Temp. °F (°C) Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 4th (1-4) Gear											
411.32 *(306.72)*	31691 *(140.97)*	4.87 *(7.83)*	1750	5.09	24.054 *(91.053)*	0.408 *(0.248)*	17.10 *(3.369)*	175 *(79.2)*	42 *(5.6)*	50 *(10.0)*	28.790 *(97.220)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crankshaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
352.07 *(262.54)*	42983 *(191.20)*	3.07 *(4.94)*	2149	14.65	2nd (1-2) Gear	175 *(79.2)*	44 *(6.7)*	54 *(12.2)*	28.820 *(97.321)*
401.98 *(299.76)*	39474 *(175.59)*	3.82 *(6.15)*	1748	8.50	3rd (1-3) Gear	176 *(79.7)*	41 *(5.0)*	50 *(10.0)*	28.860 *(97.456)*
418.37 *(311.98)*	32227 *(143.35)*	4.87 *(7.83)*	1750	5.09	4th (1-4) Gear	174 *(78.9)*	41 *(5.0)*	50 *(10.0)*	28.880 *(97.523)*
419.07 *(312.50)*	27772 *(123.54)*	5.66 *(9.11)*	1747	4.08	5th (2-1) Gear	175 *(79.4)*	41 *(5.0)*	50 *(10.0)*	28.870 *(97.490)*
420.03 *(313.22)*	22432 *(99.78)*	7.02 *(11.30)*	1752	3.12	6th (2-2) Gear	176 *(79.7)*	41 *(5.0)*	50 *(10.0)*	28.870 *(97.490)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 30.5L-32; 10; inner 14 *(95)* outer 12 *(85)*	Four 30.5L-32; 10; inner 14 *(95)* outer 12 *(85)*
Ballast	—Liquid (each)	1936 lb *(878 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Four 30.5L-32; 10; inner 14 *(95)* outer 12 *(85)*	Four 30.5L-32; 10; inner 14 *(95)* outer 12 *(85)*
Ballast	—Liquid (each inner)	1808 lb *(820 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		18 in *(455 mm)*	18 in *(455 mm)*
Static Weight with Operator	—Rear	19835 lb *(8997 kg)*	12090 lb *(5484 kg)*
	Front	26665 lb *(12095 kg)*	23050 lb *(10455 kg)*
	Total	46500 lb *(21092 kg)*	35140 lb *(15939 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 111°F *(43.9°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1462.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Versatile 1150 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1463 — STEIGER PANTHER KP-1400 DIESEL 12 SPEED

DRAWBAR PERFORMANCE AT 2100 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
327.95 (244.54)	18114 (80.57)	6.79 (10.93)	2100	2.58	20.666 (78.229)	0.440 (0.267)	15.87 (3.126)	175 (79.4)	47 (8.1)	54 (11.9)	28.860 (97.456)
75% of Pull at Maximum Power—Ten Hours 7th Gear											
258.98 (193.12)	13718 (61.02)	7.08 (11.39)	2177	2.04	17.816 (67.442)	0.480 (0.292)	14.54 (2.864)	171 (77.2)	31 (−0.3)	32 (0.1)	28.998 (97.922)
50% of Pull at Maximum Power—Two Hours 7th Gear											
176.77 (131.82)	9146 (40.68)	7.25 (11.66)	2217	1.54	14.608 (55.297)	0.576 (0.351)	12.10 (2.384)	170 (76.4)	20 (−6.9)	21 (−6.4)	29.260 (98.807)
50% of Pull at Reduced Engine Speed—Two Hours 9th Gear											
176.75 (131.80)	9146 (40.68)	7.25 (11.66)	1550	1.45	11.722 (44.373)	0.463 (0.281)	15.08 (2.970)	171 (76.9)	24 (−4.4)	25 (−3.9)	29.280 (98.874)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
278.39 (207.60)	40803 (181.50)	2.56 (4.12)	2139	14.40	2nd Gear	175 (79.2)	59 (15.0)	63 (17.2)	28.400 (95.903)
322.44 (240.44)	37909 (168.63)	3.19 (5.13)	2099	8.11	3rd Gear	174 (78.9)	58 (14.4)	61 (16.1)	28.390 (95.869)
329.80 (245.93)	31356 (139.48)	3.94 (6.35)	2103	5.54	4th Gear	175 (79.4)	58 (14.4)	62 (16.7)	28.400 (95.903)
333.18 (248.45)	25935 (115.36)	4.82 (7.75)	2101	3.88	5th Gear	176 (80.0)	59 (15.0)	63 (17.2)	28.430 (96.004)
330.32 (246.32)	21671 (96.40)	5.72 (9.20)	2099	3.72	6th Gear	175 (79.4)	58 (14.4)	62 (16.7)	28.400 (95.903)
331.28 (247.03)	18291 (81.36)	6.79 (10.93)	2100	2.58	7th Gear	175 (79.4)	46 (7.8)	52 (11.1)	28.870 (97.490)
330.90 (246.75)	15184 (67.54)	8.17 (13.15)	2098	2.17	8th Gear	175 (79.2)	51 (10.6)	56 (13.3)	28.500 (96.240)

LUGGING ABILITY IN 7th GEAR

Crankshaft Speed rpm	2100	1890	1684	1470	1249	1053
Pull—lbs (kN)	18291 (81.36)	21264 (94.59)	22755 (101.22)	23999 (106.75)	23247 (103.41)	21084 (93.79)
Increase in Pull %	0	16	24	31	27	15
Power—Hp (kW)	331.28 (247.03)	344.48 (256.88)	327.52 (244.23)	300.69 (224.22)	247.64 (184.67)	190.06 (141.73)
Speed—Mph (km/h)	6.79 (10.93)	6.07 (9.78)	5.40 (8.69)	4.70 (7.56)	3.99 (6.43)	3.38 (5.44)
Slip %	2.58	3.24	3.40	3.88	3.72	3.24

TRACTOR SOUND LEVEL WITH CAB	1700 RPM dB(A)	1900 RPM dB(A)	2100 RPM dB(A)
Maximum Available Power—Two Hours	74.5	75.0	76.0
75% of Pull at Maximum Power—Ten Hours			77.0
50% of Pull at Maximum Power—Two Hours			75.5
50% of Pull at Reduced Engine Speed—Two Hours			74.0
Bystander in 12th gear			94.0

SUPPLEMENTARY TESTS

DRAWBAR PERFORMANCE AT 1900 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
346.40 (258.31)	21275 (94.64)	6.11 (9.83)	1900	3.20	20.792 (78.704)	0.419 (0.255)	16.66 (3.282)	175 (79.4)	47 (8.1)	54 (12.2)	28.810 (97.287)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
315.08 (234.92)	41516 (184.67)	2.85 (4.58)	1906	14.21	3rd Gear	175 (79.4)	59 (15.0)	63 (17.2)	28.390 (95.869)
337.20 (251.45)	38062 (169.41)	3.51 (5.64)	1899	7.14	4th Gear	176 (80.0)	58 (14.4)	62 (16.7)	28.400 (95.903)
345.82 (257.73)	30039 (133.62)	4.31 (6.94)	1898	4.60	5th Gear	176 (80.0)	59 (15.0)	63 (17.2)	28.410 (95.936)
345.63 (257.74)	25189 (112.05)	5.15 (8.28)	1900	4.20	6th Gear	176 (80.0)	58 (14.4)	62 (16.7)	28.400 (95.903)
348.78 (260.08)	21406 (95.22)	6.11 (9.83)	1901	3.15	7th Gear	175 (79.4)	47 (8.3)	55 (12.8)	28.830 (97.355)
345.90 (257.93)	17585 (78.22)	7.38 (11.87)	1901	2.58	8th Gear	176 (79.7)	51 (10.6)	56 (13.3)	28.500 (96.240)
344.11 (256.60)	14707 (65.42)	8.77 (14.12)	1900	2.00	9th Gear	175 (79.4)	52 (11.1)	57 (13.9)	28.490 (96.206)

Department of Agricultural Engineering

Dates of Test: November 17 to December 7, 1982

Manufacturer: STEIGER TRACTOR INC., 406 Main Avenue, Fargo, North Dakota 58126

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8376 **Fuel weight** 6.974 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** CA-CD/SB-SE **To motor** 8.396 gal *(31.784 l)* **Drained from motor** 7.631 gal *(28.887 l)* **Transmission and hydraulic lubricant** SAE 10 hydraulic-transmission fluid **Final drive lubricant** SAE 85W90 **Total time engine was operated** 58.5 hours.

ENGINE: Make Cummins Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** 11059660 **Crankshaft** lengthwise **Rated rpm** 1700 to 2100 **Bore and stroke** 5.5" × 6.0" *(139.7 mm × 152.4 mm)* **Compression ratio** 14.1 to 1 **Displacement** 855 cu in *(14011 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** one full flow cartridge and one bypass cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper cartridges **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type four wheel drive with duals **Serial No.** P40000504- **Tread width** rear 85.5" *(2172 mm)* to 160.9" *(4087 mm)* front 85.5" *(2172 mm)* to 160.9" *(4087 mm)* **Wheel base** 141.5" *(3594 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 81.6" *(2073 mm)* Vertical distance above roadway 44.1" *(1120 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph (km/h)** first 2.4 *(3.9)* second 2.9 *(4.7)* third 3.4 *(5.5)* fourth 4.1 *(6.6)* fifth 4.9 *(7.9)* sixth 5.8 *(9.3)* seventh 6.8 *(10.9)* eighth 8.2 *(13.2)* ninth 9.6 *(15.4)* tenth 11.6 *(18.7)* eleventh 14.0 *(22.5)* twelfth 16.5 *(26.5)* reverse 3.0 *(4.8)*, 5.1 *(8.2)* **Clutch** multiple wet disc hydraulically power actuated and operated by foot pedal **Brakes** dual caliper disc hydraulically operated by foot pedal and mechanically by hand lever **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 285" *(7.24 m)* left 285" *(7.24 m)* **Turning space diameter** (on concrete surface without brake) right 602" *(15.29 m)* left 602" *(15.29 m)* **Power take-off** none.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

DRAWBAR PERFORMANCE AT 1700 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
331.83 (247.45)	22855 (101.66)	5.44 (8.76)	1700	3.48	19.447 (73.616)	0.400 (0.249)	17.06 (3.361)	175 (79.2)	49 (9.2)	52 (11.1)	28.515 (96.291)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
315.35 (235.16)	41834 (186.08)	2.83 (4.55)	1701	14.07	3rd Gear	175 (79.4)	58 (14.4)	61 (16.1)	28.390 (95.869)
320.52 (239.01)	38831 (172.73)	3.10 (4.98)	1703	8.55	4th Gear	176 (79.7)	58 (14.4)	62 (16.7)	28.400 (95.903)
330.41 (246.39)	32321 (143.77)	3.83 (6.17)	1700	5.46	5th Gear	177 (80.6)	60 (15.6)	64 (17.8)	28.400 (95.903)
332.62 (248.04)	27206 (121.02)	4.58 (7.38)	1700	4.52	6th Gear	177 (80.3)	58 (14.4)	62 (16.7)	28.400 (95.903)
333.99 (249.06)	23006 (102.33)	5.44 (8.76)	1700	3.56	7th Gear	175 (79.4)	50 (10.0)	55 (12.8)	28.510 (96.274)
333.94 (249.02)	19015 (84.58)	6.59 (10.60)	1700	2.66	8th Gear	176 (80.0)	52 (11.1)	57 (13.9)	28.490 (96.206)
332.59 (248.01)	15915 (70.79)	7.84 (12.61)	1700	2.25	9th Gear	176 (80.0)	51 (10.6)	56 (13.3)	28.490 (96.206)
326.97 (243.82)	12949 (57.60)	9.47 (15.24)	1700	1.91	10th Gear	173 (78.1)	50 (10.0)	54 (12.2)	28.490 (96.206)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 30.5L-32; 10; inner 14 *(95)* outer 12 *(83)*	Four 30.5L-32; 10; inner 14 *(95)* outer 12 *(83)*
Ballast	—Liquid (each inner)	1765 lb *(801 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Four 30.5L-32; 10; inner 14 *(95)* outer 12 *(83)*	Four 30.5L-32; 10; inner 14 *(95)* outer 12 *(83)*
Ballast	—Liquid (each)	1550 lb *(703 kg)*	None
	—Cast Iron (each inner)	None	None
Height of Drawbar		20.5 in *(520 mm)*	20.5 in *(520 mm)*
Static Weight with Operator	—Rear	19000 lb *(8618 kg)*	15470 lb *(7017 kg)*
	Front	24175 lb *(10966 kg)*	21065 lb *(9555 kg)*
	Total	43175 lb *(19584 kg)*	36535 lb *(16572 kg)*

Steiger Panther KP-1400 Diesel

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump inlet was maintained at 102°F *(38.9°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1463.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
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Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
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NEBRASKA TRACTOR TEST 1464 — STEIGER PANTHER CP-1400 DIESEL 12 SPEED

DRAWBAR PERFORMANCE AT 2100 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
326.50 (243.47)	18085 (80.45)	6.77 (10.90)	2100	2.63	21.885 (82.843)	0.467 (0.284)	14.92 (2.939)	179 (81.7)	50 (10.0)	58 (14.4)	28.515 (96.291)
75% of Pull at Maximum Power—Ten Hours 7th Gear											
262.94 (196.08)	13062 (61.66)	7.11 (11.45)	2202	2.41	18.626 (70.508)	0.494 (0.301)	14.12 (2.781)	175 (79.5)	35 (1.5)	39 (4.0)	28.973 (97.837)
50% of Pull at Maximum Power—Two Hours 7th Gear											
180.39 (134.52)	9242 (41.11)	7.32 (11.78)	2242	1.38	14.948 (56.586)	0.578 (0.352)	12.07 (2.377)	174 (78.9)	31 (−0.6)	32 (0.0)	28.855 (97.439)
50% of Pull at Reduced Engine Speed—Two Hours 9th Gear											
180.49 (134.59)	9241 (41.11)	7.32 (11.79)	1578	1.38	12.224 (46.273)	0.472 (0.287)	14.77 (2.909)	173 (79.4)	36 (1.9)	38 (3.1)	28.835 (97.371)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
274.56 (204.74)	40272 (179.14)	2.56 (4.11)	2157	14.89	2nd Gear	177 (80.3)	37 (2.8)	40 (4.4)	28.810 (97.287)
319.24 (238.06)	38381 (170.72)	3.12 (5.02)	2098	9.90	3rd Gear	177 (80.6)	38 (3.3)	41 (5.0)	28.770 (97.152)
333.69 (248.83)	31921 (141.99)	3.92 (6.31)	2100	5.78	4th Gear	177 (80.6)	39 (3.9)	42 (5.6)	28.760 (97.118)
332.85 (248.21)	26030 (115.78)	4.80 (7.72)	2099	3.97	5th Gear	178 (81.1)	46 (7.8)	51 (10.6)	28.610 (96.612)
330.88 (246.74)	21643 (96.27)	5.73 (9.23)	2100	3.16	6th Gear	178 (81.1)	47 (8.3)	53 (11.7)	28.580 (96.510)
333.94 (249.02)	18482 (82.21)	6.78 (10.90)	2100	2.67	7th Gear	179 (81.4)	50 (10.0)	57 (13.9)	28.500 (96.240)
334.94 (249.77)	15378 (68.40)	8.17 (13.14)	2100	2.10	8th Gear	178 (81.1)	48 (8.9)	55 (12.8)	28.550 (96.409)

LUGGING ABILITY IN 7th GEAR

Crankshaft Speed rpm	2101	1889	1676	1475	1256	1058
Pull—lbs (kN)	18482 (82.21)	21150 (94.08)	22740 (101.15)	24162 (107.48)	25031 (111.34)	24626 (109.54)
Increase in Pull %	0	14	23	31	35	33
Power—Hp (kW)	333.94 (249.02)	342.04 (255.06)	325.07 (242.40)	303.14 (226.05)	266.88 (199.01)	221.36 (165.07)
Speed—Mph (km/h)	6.78 (10.90)	6.06 (9.76)	5.36 (8.63)	4.70 (7.57)	4.00 (6.43)	3.37 (5.42)
Slip %	2.67	3.00	3.33	3.65	3.97	3.81

TRACTOR SOUND LEVEL WITH CAB	1700 RPM dB(A)	1900 RPM dB(A)	2100 RPM dB(A)
Maximum Available Power—Two Hours	73.0	73.0	78.0
75% of Pull at Maximum Power—Ten Hours			77.5
50% of Pull at Maximum Power—Two Hours			77.0
50% of Pull at Reduced Engine Speed—Two Hours			72.5
Bystander in 12th gear			96.0

SUPPLEMENTARY TESTS

DRAWBAR PERFORMANCE AT 1900 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
338.75 (252.60)	20838 (92.69)	6.10 (9.81)	1900	3.12	21.526 (81.486)	0.443 (0.270)	15.74 (3.100)	178 (81.1)	41 (4.7)	47 (8.3)	28.920 (97.659)
MAXIMUM POWER IN SELECTED GEARS											
309.99 (231.16)	40580 (180.51)	2.86 (4.61)	2026	14.26	3rd Gear			177 (80.6)	38 (3.3)	41 (5.0)	28.780 (97.186)
335.43 (250.13)	36185 (160.95)	3.48 (5.59)	1899	7.67	4th Gear			178 (80.8)	39 (3.9)	42 (5.6)	28.760 (97.118)
338.42 (252.36)	29535 (131.38)	4.30 (6.92)	1898	4.84	5th Gear			179 (81.7)	46 (7.8)	51 (10.6)	28.620 (96.645)
339.90 (253.46)	24719 (109.96)	5.16 (8.30)	1900	3.81	6th Gear			179 (81.7)	46 (7.8)	52 (11.1)	28.590 (96.544)
342.31 (255.26)	21061 (93.68)	6.10 (9.81)	1899	3.16	7th Gear			179 (81.1)	41 (5.0)	48 (8.9)	28.920 (97.659)
343.73 (256.32)	17565 (77.86)	7.36 (11.85)	1899	2.51	8th Gear			179 (81.7)	48 (8.9)	55 (12.8)	28.560 (96.443)
340.62 (254.00)	14596 (64.92)	8.75 (14.08)	1898	2.01	9th Gear			180 (82.2)	43 (6.1)	49 (9.4)	28.920 (97.659)

Department of Agricultural Engineering

Dates of Test: November 17 to December 7, 1982

Manufacturer: STEIGER TRACTOR INC., 406 Main Avenue, Fargo, North Dakota 58126

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° *(15°/15°)*** 0.8376 **Fuel weight** 6.974 lbs/gal *(0.835 kg/l)* **Oil SAE** 15W-40 **API service classification** CA-CD/SB-SE **To motor** 7.455 gal *(28.218 l)* **Drained from motor** 6.083 gal *(23.028 l)* **Transmission and hydraulic lubricant** SAE 10 hydraulic-transmission fluid **Final drive lubricant** SAE 85W90 **Total time engine was operated** 39.0 hours.

ENGINE: Make Caterpillar Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** 90U18777 **Crankshaft** lengthwise **Rated rpm** 1700 to 2100 **Bore and stroke** 5.4" × 6.5" *(137 mm × 165 mm)* **Compression ratio** 14.5 to 1 **Displacement** 893 cu in *(14636 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge and prestrainer **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type four wheel drive with duals **Serial No.** P40000501- **Tread width** rear 85.5" *(2172 mm)* to 160.9" *(4087 mm)* front 85.5" *(2172 mm)* to 160.9" *(4087 mm)* **Wheel base** 141.5" *(3594 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 81.6" *(2073 mm)* Vertical distance above roadway 44.1" *(1120 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph *(km/h)*** first 2.4 *(3.9)* second 2.9 *(4.7)* third 3.4 *(5.5)* fourth 4.1 *(6.6)* fifth 4.9 *(7.9)* sixth 5.8 *(9.3)* seventh 6.8 *(10.9)* eighth 8.2 *(13.2)* ninth 9.6 *(15.4)* tenth 11.6 *(18.7)* eleventh 14.0 *(22.5)* twelfth 16.5 *(26.5)* reverse 3.0 *(4.8)*, 5.1 *(8.2)* **Clutch** multiple wet disc hydraulically power actuated and operated by foot pedal **Brakes** dual caliper disc hydraulically operated by foot pedal and mechanically by hand lever **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 285" *(7.24 m)* left 285" *(7.24 m)* **Turning space diameter** (on concrete surface without brake) right 602" *(15.29 m)* left 602" *(15.29 m)* **Power take-off** none.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

DRAWBAR PERFORMANCE AT 1700 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
331.24 (247.01)	22851 (101.64)	5.44 (8.75)	1700	3.45	20.559 (77.822)	0.433 (0.263)	16.11 (3.174)	179 (81.7)	43 (5.8)	49 (9.4)	28.915 (97.642)
MAXIMUM POWER IN SELECTED GEARS											
305.72 (227.97)	40323 (179.37)	2.84 (4.58)	2029	14.96	3rd Gear			178 (80.8)	38 (3.3)	41 (5.0)	28.790 (97.220)
316.11 (235.72)	39246 (174.57)	3.02 (4.86)	1702	10.53	4th Gear			178 (81.1)	39 (3.9)	42 (5.6)	28.750 (97.084)
328.83 (245.21)	32293 (143.65)	3.82 (6.15)	1701	5.70	5th Gear			178 (81.1)	46 (7.8)	51 (10.6)	28.630 (96.679)
330.27 (246.28)	26961 (119.93)	4.59 (7.39)	1701	4.21	6th Gear			179 (81.7)	46 (7.8)	52 (11.1)	28.600 (96.578)
333.62 (248.78)	23022 (102.41)	5.43 (8.75)	1699	3.33	7th Gear			179 (81.7)	43 (6.1)	49 (9.4)	28.910 (97.625)
331.87 (247.47)	18925 (84.18)	6.58 (10.58)	1700	2.67	8th Gear			179 (81.7)	47 (8.3)	54 (12.2)	28.570 (96.477)
332.47 (247.92)	15920 (70.81)	7.83 (12.60)	1701	2.18	9th Gear			179 (81.7)	43 (6.1)	49 (9.4)	28.930 (97.692)
326.50 (243.47)	12947 (57.59)	9.46 (15.22)	1701	1.85	10th Gear			179 (81.7)	42 (5.6)	48 (8.9)	28.930 (97.692)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 30.5L-32; 10; inner 14 *(95)* outer 12 *(85)*	Four 30.5L-32; 10; inner 14 *(95)* outer 12 *(85)*
Ballast	—Liquid (each inner)	1910 lb *(866 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Four 30.5L-32; 10; inner 14 *(95)* outer 12 *(85)*	Four 30.5L-32; 10; inner 14 *(95)* outer 12 *(85)*
Ballast	—Liquid (each inner)	1672 lb *(759 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		20.5 in *(520 mm)*	20.5 in *(520 mm)*
Static Weight with Operator	—Rear	19215 lb *(8716 kg)*	15395 lb *(6983 kg)*
	Front	24400 lb *(11068 kg)*	21055 lb *(9551 kg)*
	Total	43615 lb *(19784 kg)*	36450 lb *(16534 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 122°F *(50.0°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1464**.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

Steiger Panther CP-1400 Diesel

NEBRASKA TRACTOR TEST 1465 — STEIGER PANTHER KP-1325 DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—Two Hours (PTO Speed—1002 rpm)

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
301.21 (224.61)	2100	17.331 (65.600)	0.402 (0.244)	17.38 (3.424)	180 (82.2)	58 (14.2)	75 (24.0)	28.947 (97.749)

VARYING POWER AND FUEL CONSUMPTION—Two Hours

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
264.22 (197.03)	2168	15.944 (60.355)	0.421 (0.256)	16.57 (3.265)	178 (81.1)	58 (14.4)	76 (24.4)	......
0.00 (0.00)	2292	4.771 (18.060)	......	......	170 (76.9)	57 (13.9)	72 (22.5)	......
135.54 (101.07)	2223	10.557 (39.963)	0.544 (0.331)	12.84 (2.529)	174 (78.9)	57 (13.9)	74 (23.1)	......
301.46 (224.80)	2101	17.371 (65.756)	0.402 (0.245)	17.35 (3.419)	182 (83.1)	58 (14.7)	76 (24.4)	......
68.40 (51.01)	2248	7.538 (28.523)	0.769 (0.468)	9.08 (1.788)	172 (77.8)	58 (14.4)	75 (23.9)	......
200.81 (149.74)	2198	13.291 (50.312)	0.462 (0.281)	15.11 (2.976)	174 (79.2)	59 (15.0)	76 (24.7)	......
Av 161.74 Av (120.61)	2205	11.578 (43.828)	0.500 (0.304)	13.97 (2.752)	175 (79.4)	58 (14.4)	75 (23.8)	28.913 (97.636)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
264.44 (197.19)	14301 (63.61)	6.93 (11.16)	2099	2.73	16.976 (64.260)	0.450 (0.274)	15.58 (3.069)	173 (78.3)	46 (7.8)	54 (12.2)	28.600 (96.578)
75% of Pull at Maximum Power—Ten Hours 7th Gear											
210.08 (156.65)	10800 (48.04)	7.29 (11.74)	2192	1.96	14.847 (56.201)	0.493 (0.301)	14.15 (2.787)	171 (77.1)	32 (0.1)	36 (2.2)	29.111 (98.303)
50% of Pull at Maximum Power—Two Hours 7th Gear											
143.13 (106.73)	7200 (32.02)	7.46 (12.00)	2229	1.52	12.090 (45.765)	0.590 (0.359)	11.84 (2.332)	170 (76.4)	26 (-3.6)	27 (-2.8)	29.250 (98.773)
50% of Pull at Reduced Engine Speed—Two Hours 10th Gear											
143.48 (106.99)	7201 (32.03)	7.47 (12.03)	1507	1.43	9.504 (35.978)	0.464 (0.282)	15.10 (2.974)	170 (76.7)	30 (-1.4)	30 (-1.1)	29.165 (98.486)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
200.28 (149.35)	34267 (152.42)	2.19 (3.53)	2164	14.80	1st Gear	170 (76.7)	26 (-3.3)	26 (-3.3)	29.190 (98.570)
234.89 (175.16)	33646 (149.66)	2.62 (4.21)	2099	12.65	2nd Gear	171 (76.9)	26 (-3.3)	26 (-3.3)	29.200 (98.604)
258.58 (192.82)	29231 (130.03)	3.32 (5.34)	2100	6.61	3rd Gear	171 (77.2)	39 (3.9)	43 (6.1)	28.760 (97.118)
262.86 (196.02)	24308 (108.13)	4.06 (6.53)	2100	4.98	4th Gear	172 (77.5)	39 (3.9)	43 (6.1)	28.740 (97.051)
265.92 (198.30)	20302 (90.31)	4.91 (7.90)	2090	4.03	5th Gear	172 (77.5)	40 (4.4)	44 (6.7)	28.710 (96.949)
263.94 (196.82)	16862 (75.01)	5.87 (9.45)	2100	3.22	6th Gear	172 (77.5)	42 (5.6)	48 (8.9)	28.680 (96.848)
267.87 (199.75)	14487 (64.44)	6.93 (11.16)	2100	2.81	7th Gear	173 (78.3)	46 (7.8)	54 (12.2)	28.590 (96.544)
264.74 (197.42)	11875 (52.82)	8.36 (13.46)	2101	2.23	8th Gear	172 (77.5)	45 (7.2)	52 (11.1)	28.630 (96.679)

Department of Agriculturel Engineering

Dates of Test: November 22 to December 18, 1982

Manufacturer: STEIGER TRACTOR, INC., 406 Main Avenue, Fargo, North Dakota 58126

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.6 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8382 **Fuel weight** 6.979 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** CA-CD/SB-SE **To motor** 8.883 gal *(33.625 l)* **Drained from motor** 8.361 gal *(31.651 l)* **Transmission and hydraulic lubricant** SAE 10 hydraulic-transmission fluid **Final drive lubricant** SAE 85W90 **Total time engine was operated** 68.5 hours.

ENGINE: Make Cummins Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** 11059656 **Crankshaft** lengthwise **Rated rpm** 1700 to 2100 **Bore and stroke** 5.5" × 6.0" *(139.7 mm × 152.4 mm)* **Compression ratio** 14.1 to 1 **Displacement** 855 cu in *(14011 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** one full flow cartridge and one bypass cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper cartridges **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type four wheel drive with duals **Serial No.** C32500508- **Tread width** rear 79" *(2007 mm)* to 136.4" *(3464 mm)* front 79" *(2007 mm)* to 136.4" *(3464 mm)* **Wheel base** 141.5" *(3594 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 75.5" *(1918 mm)* Vertical distance above roadway 45.4" *(1153 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Advertised speeds mph (km/h)** first 2.4 *(3.9)* second 2.9 *(4.7)* third 3.4 *(5.5)* fourth 4.1 *(6.6)* fifth 4.9 *(7.9)* sixth 5.8 *(9.3)* seventh 6.8 *(10.9)* eighth 8.2 *(13.2)* ninth 9.6 *(15.4)* tenth 11.6 *(18.7)* eleventh 14.0 *(22.5)* twelfth 16.5 *(26.5)* reverse 3.0 *(4.8)*, 5.1 *(8.2)* **Clutch** multiple wet disc hydraulically power actuated and operated by foot pedal **Brakes** dual caliper disc hydraulically operated by foot pedal and mechanically by hand lever **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 276" *(7.01 m)* left 276" *(7.01 m)* **Turning space diameter** (on concrete surface without brake) right 581.5" *(14.77 m)* left 581.5" *(14.77 m)* **Power take-off** 1002 rpm at 2100 engine rpm.

SUPPLEMENTARY TESTS

POWER AND FUEL CONSUMPTION AT 1900 RPM

POWER TAKE-OFF PERFORMANCE

MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—One Hour (PTO Speed—907 rpm)

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
317.51 (236.77)	1900	17.194 (65.088)	0.378 (0.230)	18.47 (3.638)	181 (82.7)	57 (14.1)	75 (23.8)	28.940 (97.726)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
280.91 (209.47)	16867 (75.03)	6.25 (10.05)	1900	3.22	17.047 (64.530)	0.425 (0.259)	16.48 (3.246)	173 (78.3)	45 (6.9)	51 (10.3)	28.580 (96.510)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
231.51 (172.64)	34186 (152.06)	2.54 (4.09)	2085	14.61	2nd Gear	171 (77.2)	25 (-3.9)	25 (-3.9)	29.200 (98.604)
250.70 (186.95)	33505 (149.04)	2.81 (4.52)	1900	12.65	3rd Gear	171 (77.2)	26 (-3.3)	26 (-3.3)	29.190 (98.570)
273.87 (204.22)	28413 (126.39)	3.61 (5.82)	1900	6.46	4th Gear	173 (78.1)	39 (3.9)	43 (6.1)	28.720 (96.983)
278.95 (208.00)	23766 (105.72)	4.40 (7.08)	1898	5.06	5th Gear	173 (78.1)	40 (4.4)	44 (6.7)	28.700 (96.916)
281.38 (209.83)	19994 (88.94)	5.28 (8.49)	1901	3.95	6th Gear	174 (78.6)	42 (5.6)	48 (8.9)	28.670 (96.814)
283.90 (211.70)	17067 (75.92)	6.24 (10.04)	1900	3.30	7th Gear	172 (77.5)	44 (6.7)	51 (10.6)	28.640 (96.713)
282.51 (210.67)	14061 (62.54)	7.53 (12.11)	1902	2.73	8th Gear	173 (78.3)	45 (7.2)	52 (11.1)	28.650 (96.679)
279.90 (208.79)	11709 (52.08)	8.97 (14.43)	1902	2.15	9th Gear	172 (77.5)	45 (7.2)	53 (11.7)	28.620 (96.645)

POWER AND FUEL CONSUMPTION AT 1700 RPM

POWER TAKE-OFF PERFORMANCE

MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—One Hour (PTO Speed—811 rpm)

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
318.98 (237.86)	1700	16.855 (63.802)	0.369 (0.224)	18.93 (3.728)	183 (83.8)	58 (14.2)	74 (23.6)	28.920 (97.659)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th Gear											
283.76 (211.60)	19122 (85.06)	5.56 (8.96)	1701	3.71	16.690 (63.180)	0.412 (0.251)	17.00 (3.349)	173 (78.3)	44 (6.4)	49 (9.2)	28.600 (96.578)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
247.69 (184.70)	34160 (151.95)	2.72 (4.38)	1880	14.48	3rd Gear	170 (76.7)	26 (-3.3)	26 (-3.3)	29.190 (98.570)
264.43 (197.18)	31706 (141.03)	3.13 (5.03)	1701	3.55	4th Gear	171 (76.9)	26 (-3.3)	26 (-3.3)	29.180 (98.536)
278.09 (207.37)	26720 (118.89)	3.90 (6.28)	1700	5.02	5th Gear	173 (78.3)	41 (5.0)	46 (7.8)	28.690 (96.882)
285.16 (212.65)	22811 (101.47)	4.69 (7.54)	1701	4.67	6th Gear	174 (78.9)	42 (5.6)	48 (8.9)	28.660 (96.781)
286.38 (213.55)	19302 (85.86)	5.56 (8.95)	1702	3.71	7th Gear	174 (78.6)	44 (6.7)	51 (10.6)	28.640 (96.713)
286.70 (213.79)	15995 (71.15)	6.72 (10.82)	1702	3.14	8th Gear	174 (78.6)	45 (7.2)	52 (11.1)	28.620 (96.645)
285.95 (213.22)	13381 (59.52)	8.01 (12.90)	1704	2.48	9th Gear	173 (78.3)	45 (7.2)	53 (11.7)	28.620 (96.645)

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 119°F *(48.3°C)*. Eight gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1465.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Steiger Panther KP-1325 Diesel

LUGGING ABILITY IN 7th GEAR						
Crankshaft Speed rpm	2100	1893	1677	1468	1256	1047
Pull—lbs *(kN)*	14487 *(64.44)*	17087 *(76.01)*	19634 *(87.34)*	21505 *(95.66)*	20565 *(91.48)*	18815 *(83.69)*
Increase in Pull %	0	18	36	48	42	30
Power—Hp *(kW)*	267.87 *(199.75)*	283.09 *(211.10)*	286.59 *(213.71)*	273.66 *(204.07)*	224.17 *(167.17)*	171.66 *(128.00)*
Speed—Mph *(km/h)*	6.93 *(11.16)*	6.21 *(10.00)*	5.47 *(8.81)*	4.77 *(7.68)*	4.09 *(6.58)*	3.42 *(5.51)*
Slip %	2.81	3.14	3.79	4.27	4.11	3.79

TRACTOR SOUND LEVEL WITH CAB	1700 RPM dB(A)	1900 RPM dB(A)	2100 RPM dB(A)
Maximum Available Power—Two Hours	72.5	73.5	75.5
75% of Pull at Maximum Power—Ten Hours			74.5
50% of Pull at Maximum Power—Two Hours			72.5
50% of Pull at Reduced Engine Speed—Two Hours			71.5
Bystander in 12th gear			94.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*	Four 23.1-34; 8; inner 16 *(110)* outer 14 *(95)*
Ballast	—Liquid (each inner)	302 lb *(137 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		13.5 in *(345 mm)*	13.5 in *(345 mm)*
Static Weight with Operator	—Rear	16710 lb *(7580 kg)*	16710 lb *(7580 kg)*
	Front	19105 lb *(8666 kg)*	18500 lb *(8391 kg)*
	Total	35815 lb *(16246 kg)*	35210 lb *(15971 kg)*

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1466
WHITE FARM EQUIPMENT-ISEKI 2-55 DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—656 rpm)								
53.32 *(39.76)*	2200	3.603 *(13.639)*	0.474 *(0.288)*	14.80 *(2.915)*	185 *(85.1)*	51 *(10.4)*	75 *(24.0)*	29.087 *(98.221)*
Standard Power Take-off Speed (540 rpm)—One Hour								
45.74 *(34.11)*	1812	3.072 *(11.629)*	0.471 *(0.286)*	14.89 *(2.933)*	187 *(85.9)*	50 *(10.3)*	75 *(24.0)*	29.085 *(98.216)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
46.60 *(34.75)*	2261	3.134 *(11.863)*	0.471 *(0.287)*	14.87 *(2.929)*	182 *(83.3)*	53 *(11.7)*	78 *(25.6)*	....
0.00 *(0.00)*	2403	1.074 *(4.066)*	....	....	175 *(79.4)*	52 *(11.1)*	76 *(24.4)*	....
23.83 *(17.77)*	2313	2.021 *(7.650)*	0.594 *(0.361)*	11.80 *(2.323)*	178 *(81.4)*	52 *(11.1)*	76 *(24.2)*	....
54.00 *(40.27)*	2200	3.583 *(13.563)*	0.465 *(0.283)*	15.07 *(2.969)*	184 *(84.7)*	51 *(10.6)*	74 *(23.3)*	....
12.15 *(9.06)*	2360	1.533 *(5.803)*	0.884 *(0.538)*	7.93 *(1.561)*	175 *(80.0)*	52 *(11.1)*	76 *(24.7)*	....
35.51 *(26.48)*	2300	2.551 *(9.657)*	0.504 *(0.306)*	13.92 *(2.742)*	181 *(82.8)*	52 *(11.1)*	76 *(24.4)*	....
Av 28.68 **Av *(21.39)***	**2306**	**2.316** ***(8.767)***	**0.566** ***(0.344)***	**12.38** ***(2.440)***	**180** ***(81.9)***	**52** ***(11.1)***	**76** ***(24.4)***	**29.060** ***(98.131)***

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 12th (HH1) Gear											
47.40 *(35.34)*	3650 *(16.24)*	4.87 *(7.84)*	2200	7.55	3.550 *(13.436)*	0.525 *(0.319)*	13.35 *(2.630)*	187 *(85.8)*	49 *(9.2)*	59 *(14.7)*	28.820 *(97.321)*
75% of Pull at Maximum Power—Ten Hours 12th (HH1) Gear											
39.12 *(29.17)*	2813 *(12.51)*	5.21 *(8.39)*	2304	5.45	2.961 *(11.208)*	0.550 *(0.323)*	13.21 *(2.603)*	184 *(84.3)*	37 *(2.6)*	43 *(6.2)*	28.844 *(97.402)*
50% of Pull at Maximum Power—Two Hours 12th (HH1) Gear											
26.82 *(20.00)*	1875 *(8.34)*	5.36 *(8.63)*	2390	3.85	2.354 *(8.913)*	0.615 *(0.374)*	11.39 *(2.244)*	185 *(84.7)*	39 *(3.9)*	45 *(6.9)*	28.950 *(97.760)*
50% of Pull at Reduced Engine Speed—Two Hours 14th (HH2) Gear											
26.80 *(19.99)*	1875 *(8.34)*	5.36 *(8.63)*	1373	3.76	2.016 *(7.630)*	0.527 *(0.321)*	13.30 *(2.620)*	181 *(82.8)*	38 *(3.6)*	45 *(6.9)*	28.905 *(97.608)*
MAXIMUM POWER IN SELECTED GEARS											
45.21 *(33.72)*	5037 *(22.41)*	3.37 *(5.42)*	2237	14.92		10th (HL2) Gear		186 *(85.6)*	43 *(6.1)*	50 *(10.0)*	28.870 *(97.490)*
46.72 *(34.84)*	4115 *(18.30)*	4.26 *(6.85)*	2198	8.75		11th (HL3) Gear		187 *(86.1)*	45 *(7.2)*	54 *(12.2)*	28.860 *(97.456)*
48.49 *(36.16)*	3728 *(16.58)*	4.88 *(7.85)*	2203	7.55		12th (HH1) Gear		187 *(86.1)*	44 *(6.7)*	52 *(11.1)*	28.870 *(97.490)*
47.67 *(35.55)*	2719 *(12.09)*	6.57 *(10.58)*	2200	5.18		13th (HL4) Gear		186 *(85.6)*	46 *(7.8)*	55 *(12.8)*	28.850 *(97.422)*
47.22 *(35.21)*	2066 *(9.19)*	8.57 *(13.79)*	2200	3.95		14th (HH2) Gear		187 *(85.8)*	47 *(8.3)*	56 *(13.3)*	28.840 *(97.388)*

Department of Agricultural Engineering

Dates of Test: March 17 - April 21, 1983

Manufacturer: ISEKI AND COMPANY, LTD., 2-6 Kioicho, Chiyoda-ku, Tokyo, Japan 102

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° *(15°/15°)*** 0.8417 **Fuel weight** 7.008 lbs/gal *(0.840 kg/l)* **Oil** White Farm Equipment Supreme Blend **SAE** 30 **API service classification** CC-CD, SD-SF **To motor** 2.139 gal *(8.096 l)* **Drained from motor** 1.999 gal *(7.568 l)* **Transmission and final drive lubricant** White Farm Equipment Company Universal Fluid **Total time engine was operated** 53.0 hours

ENGINE: Make Isuzu Diesel **Model** 4BC2 **Type** four cylinder vertical **Serial No.** 905747 **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 4.02" x 3.94" *(102 mm x 100 mm)* **Compression ratio** 17 to 1 **Displacement** 199.4 cu in *(3268 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow element **Oil cooler** engine coolant heat exchanger for crankcase oil **Fuel filter** two paper elements with sediment bowl and screen **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type front wheel assist **Serial No.** 00189 m **Tread width** rear 55.5" *(1410 mm)* to 79.1" *(2010 mm)* front 59.3" *(1505 mm)* **Wheel base** 80.3" *(2040 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 34.0" *(865 mm)* Vertical distance above roadway 30.0" *(762 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 0.4 *(0.7)* second 0.7 *(1.1)* third 0.8 *(1.4)* fourth 1.0 *(1.5)* fifth 1.3 *(2.0)* sixth 1.6 *(2.6)* seventh 1.9 *(3.1)* eighth 2.2 *(3.6)* ninth 2.9 *(4.6)* tenth 3.8 *(6.0)* eleventh 4.5 *(7.2)* twelfth 5.1 *(8.1)* thirteenth 6.7 *(10.7)* fourteenth 8.6 *(13.8)* fifteenth 10.3 *(16.5)* sixteenth 15.2 *(24.5)* reverse 0.6 *(0.9)*, 1.3 *(2.0)*, 2.9 *(4.7)*, 6.6 *(10.7)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc operated by two foot pedals which can be locked together and hand lever **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 122" *(3.10 m)* left 122" *(3.10 m)* (on concrete surface without brake) right 145" *(3.70 m)* left 145" *(3.70 m)* **Turning space diameter** (on concrete surface with brake applied) right 254" *(6.44 m)* left 254" *(6.44 m)* (on concrete surface without brake) right 300" *(7.62 m)* left 300" *(7.62 m)* **Power take-off** 540 rpm at 1812 engine rpm.

LUGGING ABILITY IN 12th (HH1) GEAR

Crankshaft Speed rpm	2203	1982	1756	1545	1316	1104
Pull—lbs *(kN)*	3728 *(16.58)*	3812 *(16.96)*	3905 *(17.37)*	3958 *(17.61)*	3953 *(17.58)*	3760 *(16.73)*
Increase in Pull %	0	2	5	6	6	1
Power—Hp *(kW)*	48.49 *(36.16)*	44.47 *(33.16)*	40.29 *(30.05)*	35.82 *(26.71)*	30.49 *(22.74)*	24.47 *(18.25)*
Speed—Mph *(km/h)*	4.88 *(7.85)*	4.37 *(7.04)*	3.87 *(6.23)*	3.39 *(5.46)*	2.89 *(4.66)*	2.44 *(3.93)*
Slip %	7.55	7.73	8.09	8.33	8.21	7.73

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	92.0	91.0
75% of Pull at Maximum Power—Ten Hours		91.0
50% of Pull at Maximum Power—Two Hours		91.5
50% of Pull at Reduced Engine Speed—Two Hours		88.0
Bystander in 16th (HH4) gear		85.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 12th (HH1) Gear											
47.63 *(35.52)*	3577 *(15.91)*	4.99 *(8.04)*	2202	5.50	3.567 *(13.504)*	0.525 *(0.319)*	13.35 *(2.630)*	187 *(85.8)*	52 *(10.8)*	62 *(16.4)*	28.765 *(97.135)*
MAXIMUM POWER IN SELECTED GEARS											
44.39 *(33.10)*	6318 *(28.10)*	2.63 *(4.24)*	2262	14.81		9th (LH4) Gear		185 *(85.0)*	42 *(5.6)*	49 *(9.4)*	28.870 *(97.490)*
48.74 *(36.34)*	3668 *(16.32)*	4.98 *(8.02)*	2198	5.46		12th (HH1) Gear		187 *(85.8)*	43 *(6.1)*	51 *(10.6)*	28.870 *(97.490)*

TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 16.9-30, 6, 16 *(110)*	Two 16.9-30, 6, 16 *(110)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	372 lb *(169 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 9.5-24, 6, 30 *(205)*	Two 9.5-24, 6, 30 *(205)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	58 lb *(26 kg)*	None
Height of Drawbar		17 in *(430 mm)*	17 in *(430 mm)*
Static Weight with Operator	—Rear	4400 lb *(1996 kg)*	3655 lb *(1658 kg)*
	Front	2655 lb *(1204 kg)*	2540 lb *(1152 kg)*
	Total	7055 lb *(3200 kg)*	6195 lb *(2810 kg)*

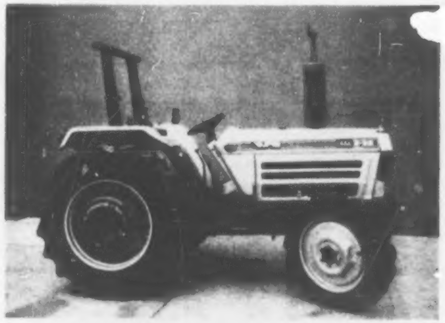
REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For maximum power tests, the fuel temperature at the injection pump was maintained at 178°F *(81.2°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1466**.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



White Farm Equipment-Iseki 2-55 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1467
WHITE FARM EQUIPMENT-ISEKI 2-65 DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—656 rpm)								
62.50 *(46.61)*	2200	4.038 *(15.285)*	0.453 *(0.275)*	15.48 *(3.049)*	189 *(87.1)*	52 *(11.4)*	75 *(24.1)*	28.953 *(97.771)*
Standard Power Take-off Speed (540 rpm)—One Hour								
55.40 *(41.31)*	1812	3.421 *(12.950)*	0.433 *(0.263)*	16.19 *(3.190)*	195 *(90.4)*	52 *(10.9)*	75 *(23.8)*	28.930 *(97.692)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
55.22 *(41.18)*	2288	3.562 *(13.484)*	0.452 *(0.273)*	15.50 *(3.054)*	184 *(84.2)*	52 *(11.4)*	75 *(23.9)*	....
0.00 *(0.00)*	2426	1.224 *(4.633)*	....	....	179 *(81.7)*	52 *(11.4)*	74 *(23.1)*	....
28.35 *(21.14)*	2349	2.291 *(8.672)*	0.566 *(0.344)*	12.38 *(2.438)*	181 *(82.8)*	53 *(11.7)*	76 *(24.7)*	....
63.30 *(47.20)*	2204	4.046 *(15.316)*	0.448 *(0.272)*	15.64 *(3.082)*	186 *(85.8)*	53 *(11.7)*	74 *(23.6)*	....
14.37 *(10.72)*	2361	1.751 *(6.628)*	0.854 *(0.519)*	8.21 *(1.617)*	179 *(81.7)*	53 *(11.7)*	76 *(24.4)*	....
41.93 *(31.27)*	2316	2.864 *(10.841)*	0.479 *(0.291)*	14.64 *(2.884)*	182 *(83.3)*	52 *(11.4)*	73 *(22.8)*	....
Av 33.86 Av *(25.25)*	2324	2.623 *(9.929)*	0.543 *(0.330)*	12.91 *(2.543)*	182 *(83.2)*	53 *(11.6)*	75 *(23.8)*	28.760 *(97.391)*

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 13th (HL4) Gear											
55.71 *(41.54)*	3205 *(14.25)*	6.52 *(10.49)*	2200	6.50	3.996 *(15.127)*	0.503 *(0.306)*	13.94 *(2.746)*	186 *(85.6)*	41 *(4.7)*	50 *(9.7)*	28.845 *(97.409)*
75% of Pull at Maximum Power—Ten Hours 13th (HL4) Gear											
44.41 *(33.12)*	2381 *(10.59)*	6.99 *(11.26)*	2316	4.74	3.354 *(12.736)*	0.531 *(0.323)*	13.20 *(2.600)*	183 *(83.8)*	36 *(2.0)*	39 *(4.1)*	28.965 *(97.810)*
50% of Pull at Maximum Power—Two Hours 13th (HL4) Gear											
30.42 *(22.68)*	1588 *(7.06)*	7.[illegible] *(11.5[illegible])*	2344	3.38	2.694 *(10.197)*	0.621 *(0.377)*	11.29 *(2.224)*	184 *(84.2)*	39 *(3.9)*	44 *(6.4)*	28.675 *(96.831)*
50% of Pull at Reduced Engine Speed—Two Hours 15th (HH3) Gear											
30.44 *(22.70)*	1588 *(7.06)*	7.19 *(11.57)*	1523	3.21	2.212 *(8.374)*	0.509 *(0.310)*	13.76 *(2.711)*	181 *(82.8)*	38 *(3.3)*	42 *(5.6)*	28.650 *(96.747)*
MAXIMUM POWER IN SELECTED GEARS											
52.23 *(38.95)*	4827 *(21.47)*	4.06 *(6.53)*	2227	14.70	11th (HL3) Gear			185 *(85.0)*	37 *(2.8)*	44 *(6.7)*	28.950 *(97.760)*
55.12 *(41.10)*	4350 *(19.35)*	4.75 *(7.65)*	2201	10.22	12th (HH1) Gear			186 *(85.6)*	39 *(3.9)*	46 *(7.8)*	28.900 *(97.591)*
56.67 *(42.26)*	3265 *(14.52)*	6.51 *(10.48)*	2200	6.57	13th (HL4) Gear			186 *(85.6)*	38 *(3.3)*	45 *(7.2)*	28.910 *(97.625)*
56.54 *(42.16)*	2481 *(11.04)*	8.55 *(13.75)*	2200	4.85	14th (HH2) Gear			186 *(85.6)*	40 *(4.4)*	47 *(8.3)*	28.880 *(97.523)*

LUGGING ABILITY IN 13th (HL4) GEAR

Crankshaft Speed rpm	2200	1980	1752	1539	1309	1103
Pull—lbs *(kN)*	3265 *(14.52)*	3441 *(15.31)*	3602 *(16.02)*	3716 *(16.53)*	3783 *(16.83)*	3740 *(16.64)*
Increase in Pull %	0	5	10	14	16	15
Power—Hp *(kW)*	56.67 *(42.26)*	53.49 *(39.89)*	49.28 *(36.75)*	44.52 *(33.20)*	38.43 *(28.66)*	32.07 *(23.91)*
Speed—Mph *(km/h)*	6.51 *(10.48)*	5.83 *(9.38)*	5.13 *(8.26)*	4.49 *(7.23)*	3.81 *(6.13)*	3.22 *(5.17)*
Slip %	6.57	7.12	7.74	7.98	8.34	8.10

Department of Agricultural Engineering

Dates of Test: March 18 to April 20, 1983

Manufacturer: ISEKI AND COMPANY, LTD.,
2-6 Kioicho, Chiyoda-ku, Tokyo, Japan 102

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8416 **Fuel weight** 7.007 lbs/gal *(0.840 kg/l)* **Oil** White Farm Equipment Supreme Blend **SAE** 30 **API service classification** CC-CD, SD-SF **To motor** 2.148 gal *(8.132 l)* **Drained from motor** 1.911 gal *(7.233 l)* **Transmission and final drive lubricant** White Farm Equipment Company Universal Fluid **Total time engine was operated** 41.0 hours

ENGINE: Make Isuzu Diesel **Model** 4BDI **Type** four cylinder vertical **Serial No.** 906159 **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 4.02" x 4.65" *(102 mm x 118 mm)* **Compression ratio** 17.5 to 1 **Displacement** 235 cu in *(3856 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow element **Oil cooler** engine coolant heat exchanger for crankcase oil **Fuel filter** two paper elements with sediment bowl and screen **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type front wheel assist **Serial No.** 00215 m **Tread width** rear 55.5" *(1410 mm)* to 79.1" *(2010 mm)* front 59.3" *(1505 mm)* **Wheel base** 84.6" *(2150 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 36.9" *(937 mm)* Vertical distance above roadway 30.0" *(762 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 0.4 *(0.7)* second 0.7 *(1.1)* third 0.8 *(1.4)* fourth 1.0 *(1.5)* fifth 1.3 *(2.0)* sixth 1.6 *(2.6)* seventh 1.9 *(3.1)* eighth 2.2 *(3.6)* ninth 2.9 *(4.6)* tenth 3.8 *(6.0)* eleventh 4.5 *(7.2)* twelfth 5.1 *(8.1)* thirteenth 6.7 *(10.7)* fourteenth 8.6 *(13.8)* fifteenth 10.3 *(16.5)* sixteenth 15.2 *(24.5)* reverse 0.6 *(0.9)*, 1.3 *(2.0)*, 2.9 *(4.7)*, 6.6 *(10.7)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc operated by two foot pedals which can be locked together and hand lever **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 128" *(3.24 m)* left 128" *(3.24 m)* (on concrete surface without brake) right 160" *(4.06 m)* left 160" *(4.06 m)* **Turning space diameter** (on concrete surface with brake applied) right 265" *(6.73 m)* left 265" *(6.73 m)* (on concrete surface without brake) right 330" *(8.38 m)* left 330" *(8.38 m)* **Power take-off** 540 rpm at 1812 engine rpm

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	94.5	94.0
75% of Pull at Maximum Power—Ten Hours		94.0
50% of Pull at Maximum Power—Two Hours		93.5
50% of Pull at Reduced Engine Speed—Two Hours		89.5
Bystander in 16th (HH4) gear		86.0

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 13th (HL4) Gear											
55.88 *(41.67)*	3144 *(13.99)*	6.66 *(10.73)*	2200	4.60	4.050 *(15.329)*	0.508 *(0.309)*	13.80 *(2.718)*	187 *(85.8)*	42 *(5.3)*	50 *(10.0)*	28.795 *(97.236)*
MAXIMUM POWER IN SELECTED GEARS											
44.26 *(33.01)*	6187 *(27.52)*	2.68 *(4.32)*	2292	14.77	9th (LH4) Gear			183 *(83.6)*	35 *(1.7)*	40 *(4.4)*	28.970 *(97.827)*
56.85 *(42.39)*	3203 *(14.25)*	6.66 *(10.71)*	2200	4.79	13th (HL4) Gear			186 *(85.6)*	38 *(3.3)*	45 *(7.2)*	28.950 *(97.760)*

TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 16.9-30; 6; 16 *(110)*	Two 16.9-30; 6; 16 *(110)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	347 lb *(158 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 9.5-24; 6; 30 *(205)*	Two 9.5-24; 6; 30 *(205)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	46 lb *(21 kg)*	None
Height of Drawbar		17.5 in *(445 mm)*	17.5 in *(445 mm)*
Static Weight with Operator	—Rear	4345 lb *(1971 kg)*	3650 lb *(1656 kg)*
	Front	2765 lb *(1254 kg)*	2670 lb *(1211 kg)*
	Total	7110 lb *(3225 kg)*	6320 lb *(2867 kg)*

White Farm Equipment-Iseki 2-65 Diesel

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For maximum power tests, the fuel temperature at the injection pump was maintained at 170°F *(76.8°C)*. Four gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1467**.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1468 — WHITE FARM EQUIPMENT 2-110 DIESEL 18 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F *(°C)* Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1007 rpm)								
110.52 *(82.41)*	2200	6.589 *(24.942)*	0.418 *(0.254)*	16.77 *(3.304)*	183 *(83.7)*	52 *(11.2)*	75 *(23.8)*	29.023 *(98.007)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
95.81 *(71.45)*	2242	5.943 *(22.497)*	0.435 *(0.264)*	16.12 *(3.176)*	179 *(81.7)*	52 *(11.4)*	74 *(23.6)*	......
0.00 *(0.00)*	2374	2.064 *(7.813)*	.....	.....	173 *(78.3)*	52 *(11.1)*	76 *(24.2)*	......
49.21 *(36.70)*	2304	4.050 *(15.331)*	0.577 *(0.351)*	12.15 *(2.394)*	175 *(79.4)*	52 *(11.1)*	73 *(22.8)*	......
111.86 *(83.41)*	2199	6.636 *(25.120)*	0.416 *(0.253)*	16.86 *(3.320)*	182 *(83.1)*	52 *(11.4)*	76 *(24.2)*	......
24.90 *(18.57)*	2332	3.100 *(11.735)*	0.872 *(0.531)*	8.03 *(1.582)*	174 *(78.9)*	53 *(11.7)*	76 *(24.4)*	......
72.91 *(54.37)*	2276	4.945 *(18.719)*	0.475 *(0.289)*	14.74 *(2.903)*	176 *(80.0)*	52 *(11.4)*	74 *(23.6)*	......
Av 59.11 **Av** *(44.08)*	2288	4.456 *(16.868)*	0.528 *(0.321)*	13.27 *(2.613)*	176 *(80.2)*	52 *(11.3)*	75 *(23.8)*	29.007 *(97.951)*

DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cool-ing med.	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 11th (4D) Gear											
93.66 *(69.84)*	5494 *(24.44)*	6.39 *(10.29)*	2199	3.76	6.601 *(24.986)*	0.494 *(0.300)*	14.19 *(2.795)*	183 *(83.9)*	53 *(11.7)*	63 *(17.2)*	28.500 *(96.240)*
75% of Pull at Maximum Power—Ten Hours 11th (4D) Gear											
74.24 *(55.36)*	4144 *(18.43)*	6.72 *(10.81)*	2270	4.08	5.676 *(21.488)*	0.536 *(0.326)*	13.08 *(2.577)*	180 *(81.9)*	44 *(6.8)*	49 *(9.2)*	28.860 *(97.456)*
50% of Pull at Maximum Power—Two Hours 11th (4D) Gear											
50.86 *(37.93)*	2765 *(12.29)*	6.90 *(11.11)*	2305	3.00	4.692 *(17.760)*	0.646 *(0.393)*	10.84 *(2.136)*	177 *(80.6)*	35 *(1.4)*	36 *(2.2)*	29.065 *(98.148)*
50% of Pull at Reduced Engine Speed—Two Hours 15th (5O) Gear											
50.98 *(38.01)*	2764 *(12.29)*	6.92 *(11.13)*	1402	2.84	3.675 *(13.911)*	0.505 *(0.307)*	13.87 *(2.733)*	179 *(81.4)*	38 *(3.1)*	39 *(3.9)*	29.045 *(98.081)*
MAXIMUM POWER IN SELECTED GEARS											
84.15 *(62.75)*	9500 *(42.26)*	3.32 *(5.35)*	2220	14.77	5th (2D) Gear			181 *(82.8)*	49 *(9.4)*	54 *(12.2)*	28.580 *(96.510)*
86.87 *(64.78)*	9138 *(40.65)*	3.57 *(5.74)*	2199	12.73	6th (3U) Gear			181 *(82.8)*	50 *(10.0)*	56 *(13.3)*	28.580 *(96.510)*
90.30 *(67.34)*	8143 *(36.22)*	4.16 *(6.69)*	2200	10.15	7th (2O) Gear			182 *(83.3)*	52 *(11.1)*	61 *(16.1)*	28.530 *(96.342)*
91.81 *(68.46)*	7705 *(34.27)*	4.47 *(7.19)*	2201	9.21	8th (3D) Gear			183 *(83.6)*	52 *(11.1)*	61 *(16.1)*	28.540 *(96.375)*
91.89 *(68.52)*	6607 *(29.39)*	5.22 *(8.39)*	2199	7.42	9th (4U) Gear			182 *(83.3)*	52 *(11.1)*	61 *(16.1)*	28.540 *(96.375)*
90.78 *(67.69)*	6184 *(27.51)*	5.50 *(8.86)*	2200	6.66	10th (3O) Gear			182 *(83.3)*	52 *(11.1)*	60 *(15.6)*	28.550 *(96.409)*
94.90 *(70.77)*	5561 *(24.73)*	6.40 *(10.30)*	2199	5.64	11th (4D) Gear			182 *(83.3)*	51 *(10.6)*	59 *(15.0)*	28.560 *(96.443)*
92.72 *(69.14)*	4727 *(21.02)*	7.36 *(11.84)*	2200	4.85	12th (5U) Gear			182 *(83.3)*	52 *(11.1)*	60 *(15.6)*	28.530 *(96.342)*
92.81 *(69.21)*	4482 *(19.93)*	7.77 *(12.50)*	2199	4.68	13th (4O) Gear			182 *(83.3)*	52 *(11.1)*	60 *(15.6)*	28.520 *(96.308)*
93.97 *(70.08)*	3933 *(17.49)*	8.96 *(14.42)*	2200	3.79	14th (5D) Gear			182 *(83.3)*	52 *(11.1)*	60 *(15.6)*	28.520 *(96.308)*

Department of Agricultural Engineering

Dates of Test: March 17 to April 5, 1983

MANUFACTURER: WHITE FARM EQUIPMENT COMPANY, 2625 Butterfield Road, Oak Brook, Illinois 60521

FUEL, OIL AND TIME: FUEL No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8416 **Fuel weight** 7.007 lbs/gal *(0.840 kg/l)* **Oil** White Farm Equipment Company Supreme Blend **SAE** 30 **API service classification** CC-CD, SD-SF **To motor** 3.424 gal *(12.961 l)* **Drained from motor** 2.639 gal *(9.990 l)* **Transmission and final drive lubricant** White Farm Equipment Company Universal Fluid **Front axle lubricant** SAE 80-90 multi-purpose gear lubricant **Total time engine was operated** 43.5 hours

ENGINE: Make Perkins Diesel **Type** six cylinder vertical with turbocharger **Serial No.** TU70018U668790J **Crankshaft** lengthwise **Rated rpm** 2000 to 2200 **Bore and stroke** 3.875" x 5.00" *(98.4 mm x 127 mm)* **Compression ratio** 15.5 to 1 **Displacement** 354 cu in *(5802 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** two paper cartridges **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and hydraul shift oil **Fuel Filter** two paper elements and water separator **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: Type front wheel assist **Serial No.** 301398-136 **Tread width** rear 62.5" *(1588 mm)* to 111" *(2820 mm)* front 66" *(1680 mm)* to 80" *(2030 mm)* **Wheel base** 86.3" *(2192 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 33.7" *(856 mm)* Vertical distance above roadway 43.3" *(1100 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) range operator controlled powershift **Advertised speeds mph *(km/h)*** first 1.6 *(2.6)* second 2.0 *(3.2)* third 2.4 *(3.9)* fourth 3.1 *(5.0)* fifth 3.7 *(6.0)* sixth 3.9 *(6.3)* seventh 4.4 *(7.1)* eighth 4.7 *(7.6)* ninth 5.4 *(8.7)* tenth 5.7 *(9.2)* eleventh 6.5 *(10.5)* twelfth 7.4 *(11.9)* thirteenth 7.8 *(12.6)* fourteenth 8.9 *(14.3)* fifteenth 10.7 *(17.2)* sixteenth 13.0 *(20.9)* seventeenth 15.7 *(25.2)* eighteenth 18.8 *(30.3)* reverse 2.0 *(3.2)*, 2.4 *(3.9)*, 2.8 *(4.5)*, 4.7 *(7.6)*, 5.7 *(9.2)*, 6.8 *(10.9)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple dry disc hydraulically power actuated by two foot pedals which can be locked together and mechanically by hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 195" *(4.95 m)* left 195" *(4.95 m)* (on concrete surface without brake) right 235" *(5.92 m)* left 235" *(5.92 m)* **Turning space diameter** (on concrete surface with brake applied) 406" *(10.31m)* left 406" *(10.31 m)* (on concrete surface without brake) right 482" *(12.24 m)* left 482" *(12.24 m)* **Power take-off** 1007 rpm at 2200 engine rpm and 540 rpm at 2192 engine rpm.

REPAIRS and ADJSUTMENTS: No repairs or adjustments

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure For maximum power tests, the fuel temperature at the injection pump was maintained at 167°F *(75.1°C)*. Ten gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1468.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

LUGGING ABILITY IN 11th (4D) GEAR

Crankshaft Speed rpm	2198	1987	1751	1540	1308	1100
Pull—lbs *(kN)*	5561 *(24.73)*	6260 *(27.85)*	7041 *(31.32)*	7398 *(32.91)*	7533 *(33.51)*	7098 *(31.57)*
Increase in Pull %	0	13	27	33	35	28
Power—Hp *(kW)*	94.90 *(70.77)*	95.54 *(71.25)*	93.47 *(69.70)*	85.78 *(63.96)*	73.97 *(55.16)*	58.99 *(43.99)*
Speed—Mph *(km/h)*	6.40 *(10.30)*	5.72 *(9.21)*	4.98 *(8.01)*	4.35 *(7.00)*	3.68 *(5.93)*	3.12 *(5.02)*
Slip %	5.64	6.66	7.88	8.62	8.77	8.33

TRACTOR SOUND LEVEL WITH CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	78.0	79.0
75% of Pull at Maximum Power—Ten Hours		78.0
50% of Pull at Maximum Power—Two Hours		78.0
50% of Pull at Reduced Engine Speed—Two Hours		77.5
Bystander in 18th (6O) gear		87.5

DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cool-ing med.	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 11th (4D) Gear											
95.07 *(70.89)*	5430 *(24.15)*	6.57 *(10.57)*	2199	3.49	6.583 *(24.918)*	0.485 *(0.295)*	14.44 *(2.845)*	183 *(83.9)*	52 *(10.8)*	58 *(14.4)*	28.525 *(96.325)*
MAXIMUM POWER IN SELECTED GEARS											
73.85 *(55.07)*	12944 *(57.58)*	2.14 *(3.44)*	2252	14.83	3rd (1O) Gear			179 *(81.7)*	47 *(8.3)*	52 *(11.1)*	28.580 *(96.510)*
96.08 *(71.65)*	5494 *(24.44)*	6.56 *(10.56)*	2198	3.49	11th (4D) Gear			182 *(83.3)*	51 *(10.6)*	58 *(14.4)*	28.570 *(96.477)*

SUPPLEMENTARY TESTS
POWER AND FUEL CONSUMPTION AT 2000 RPM
POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F *(°C)* Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—915 rpm)								
111.56 *(83.19)*	2000	6.381 *(24.155)*	0.401 *(0.244)*	17.48 *(3.444)*	184 *(84.3)*	52 *(11.2)*	75 *(23.7)*	29.015 *(97.979)*

TIRES, BALLAST AND WEIGHT		**Tested Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 20.8-38, 8, 16 *(110)*
Ballast	—Liquid (each)	None
	—Cast Iron (each)	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 16.9-26, 8, 18 *(125)*
Ballast	—Liquid (each)	None
	—Cast Iron (each)	None
Height of Drawbar		18 in *(457 mm)*
Static Weight with Operator	—Rear	8430 lb *(3824 kg)*
	—Front	5525 lb *(2506 kg)*
	—Total	13955 lb *(6330 kg)*

White Farm Equipment 2-110 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1469 — JOHN DEERE 2150 DIESEL 16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—567 rpm)								
46.47 *(34.65)*	2500	3.214 *(12.166)*	0.485 *(0.295)*	14.46 *(2.848)*	187 *(86.3)*	53 *(11.7)*	75 *(23.8)*	28.950 *(97.692)*
Standard Power Take-off Speed (540 rpm)—One Hour								
46.13 *(34.40)*	2383	3.123 *(11.822)*	0.475 *(0.289)*	14.77 *(2.910)*	188 *(86.6)*	55 *(12.8)*	75 *(23.7)*	28.880 *(97.521)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
41.10 *(30.65)*	2604	2.952 *(11.175)*	0.504 *(0.306)*	13.92 *(2.743)*	185 *(85.0)*	53 *(11.7)*	74 *(23.1)*	......
0.00 *(0.00)*	2670	1.279 *(4.842)*	.....	.....	178 *(81.1)*	55 *(12.8)*	76 *(24.2)*	......
20.80 *(15.51)*	2634	1.964 *(7.435)*	0.662 *(0.403)*	10.59 *(2.086)*	180 *(82.5)*	52 *(11.4)*	76 *(24.7)*	......
46.56 *(34.72)*	2500	3.243 *(12.276)*	0.488 *(0.297)*	14.36 *(2.828)*	188 *(86.7)*	54 *(12.5)*	76 *(24.4)*	......
10.56 *(7.87)*	2672	1.613 *(6.106)*	1.071 *(0.652)*	6.55 *(1.289)*	179 *(81.7)*	51 *(10.6)*	72 *(22.5)*	......
31.23 *(23.29)*	2634	2.422 *(9.168)*	0.544 *(0.331)*	12.90 *(2.540)*	183 *(83.9)*	54 *(11.9)*	76 *(24.2)*	......
Av 25.04 Av *(18.67)*	2619	2.245 *(8.498)*	0.629 *(0.383)*	11.15 *(2.197)*	182 *(83.3)*	53 *(11.8)*	75 *(23.8)*	28.838 *(97.380)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.h/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 9th (5L) Gear											
38.11 *(28.42)*	2879 *(12.80)*	4.97 *(7.99)*	2500	6.45	3.209 *(12.147)*	0.590 *(0.359)*	11.88 *(2.340)*	189 *(87.2)*	53 *(11.7)*	61 *(15.8)*	28.875 *(97.507)*
75% of Pull at Maximum Power—Ten Hours 9th (5L) Gear											
30.93 *(23.07)*	2203 *(9.80)*	5.27 *(8.47)*	2612	5.09	2.752 *(10.419)*	0.624 *(0.379)*	11.24 *(2.214)*	188 *(86.6)*	61 *(16.2)*	74 *(23.2)*	28.303 *(95.575)*
50% of Pull at Maximum Power—Two Hours 9th (5L) Gear											
21.27 *(15.86)*	1469 *(6.53)*	5.43 *(8.74)*	2649	3.34	2.246 *(8.503)*	0.740 *(0.450)*	9.47 *(1.865)*	184 *(84.4)*	49 *(9.2)*	53 *(11.7)*	28.805 *(97.270)*
50% of Pull at Reduced Engine Speed—Two Hours 12th (6H) Gear											
21.16 *(15.78)*	1470 *(6.54)*	5.40 *(8.69)*	1497	3.31	1.551 *(5.871)*	0.514 *(0.313)*	13.65 *(2.688)*	187 *(86.1)*	51 *(10.7)*	79 *(25.8)*	28.575 *(96.495)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
34.99 *(26.09)*	4875 *(21.68)*	2.69 *(4.33)*	2568	14.75	5th (3L) Gear	186 *(85.6)*	48 *(8.9)*	51 *(10.6)*	28.680 *(96.848)*
36.42 *(27.16)*	3891 *(17.31)*	3.51 *(5.65)*	2502	10.53	6th (3H) Gear	190 *(87.8)*	56 *(13.3)*	66 *(18.9)*	28.750 *(97.084)*
37.29 *(27.81)*	3727 *(16.58)*	3.75 *(6.04)*	2502	9.44	7th (4L) Gear	189 *(87.2)*	56 *(13.3)*	66 *(18.9)*	28.760 *(97.118)*
37.65 *(28.06)*	2868 *(12.76)*	4.92 *(7.92)*	2498	6.57	8th (4H) Gear	189 *(86.9)*	55 *(12.8)*	64 *(17.8)*	28.760 *(97.118)*
38.68 *(28.84)*	2937 *(13.06)*	4.94 *(7.95)*	2498	6.74	9th (5L) Gear	188 *(86.7)*	55 *(12.7)*	61 *(16.1)*	28.760 *(97.118)*
38.44 *(28.66)*	2248 *(10.00)*	6.41 *(10.32)*	2502	5.19	10th (5H) Gear	190 *(87.5)*	57 *(13.9)*	68 *(20.0)*	28.750 *(97.084)*
38.60 *(28.25)*	2077 *(9.24)*	6.98 *(11.24)*	2500	4.56	11th (6L) Gear	189 *(87.2)*	57 *(13.9)*	68 *(20.0)*	28.740 *(97.051)*
37.41 *(27.90)*	1557 *(6.93)*	9.01 *(14.50)*	2502	3.43	12th (6H) Gear	190 *(87.5)*	58 *(14.4)*	70 *(21.1)*	28.740 *(97.051)*

Department of Agricultural Engineering

Dates of Test: April 15 to May 9, 1983

Manufacturer: JOHN DEERE WERKE MANNHEIM, Mannheim, West Germany

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8421 **Fuel weight** 7.012 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 1.484 gal *(5.617 l)* **Drained from motor** 1.278 gal *(4.840 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 45.0 hours.

ENGINE: Make John Deere Diesel **Type** three cylinder vertical **Serial No.** 3179DL11551101CD **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 4.19" x 4.33" *(106.5 mm x 110 mm)* **Compression ratio** 16.8 to 1 **Displacement** 179 cu in *(2934 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and one mesh strainer **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *L02150T466895* **Tread width** rear 55.1" *(1400 mm)* to 78.7" *(1999 mm)* front 49.5" *(1257 mm)* to 79.5" *(2019 mm)* **Wheel base** 74.4" *(1890 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 30.8" *(781 mm)* Vertical distance above roadway 31.0" *(787 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.6 *(2.5)* second 2.0 *(3.2)* third 2.2 *(3.5)* fourth 2.8 *(4.4)* fifth 3.1 *(5.0)* sixth 4.0 *(6.4)* seventh 4.2 *(6.8)* eighth 5.3 *(8.6)* ninth 5.4 *(8.7)* tenth 6.8 *(11.0)* eleventh 7.4 *(12.0)* twelfth 9.5 *(15.2)* thirteenth 10.7 *(17.2)* fourteenth 13.6 *(21.8)* fifteenth 14.4 *(23.2)* sixteenth 18.3 *(29.5)* reverse 2.4 *(3.9)*, 3.1 *(4.9)*, 3.3 *(5.4)*, 4.2 *(6.8)*, 4.8 *(7.7)*, 6.1 *(9.8)*, 6.5 *(10.4)*, 8.2 *(13.2)* **Clutch** single dry disc operated by foot pedal **Brakes** wet disc hydraulically actuated and operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 110" *(2.80 m)* left 110" *(2.80 m)* (on concrete surface without brake) right 122" *(3.10 m)* left 122" *(3.10 m)* **Turning space diameter** (on concrete surface with brake applied) right 244" *(6.20 m)* left 244" *(6.20 m)* (on concrete surface without brake) right 268" *(6.81 m)* left 268" *(6.81 m)* **Power take-off** 540 rpm at 2383 engine rpm.

LUGGING ABILITY IN 9th (5L) GEAR

Crankshaft Speed rpm	2498	2250	2013	1753	1508	1261
Pull—lbs *(kN)*	2937 *(13.06)*	3217 *(14.31)*	3419 *(15.21)*	3640 *(16.19)*	3887 *(17.29)*	3873 *(17.23)*
Increase in Pull %	0	10	16	24	32	32
Power—Hp *(kW)*	38.68 *(28.84)*	37.84 *(28.21)*	35.60 *(26.61)*	32.79 *(24.45)*	29.79 *(22.21)*	24.84 *(18.52)*
Speed—Mph *(km/h)*	4.94 *(7.95)*	4.41 *(7.10)*	3.91 *(6.30)*	3.38 *(5.44)*	2.87 *(4.62)*	2.40 *(3.87)*
Slip %	6.74	7.06	8.26	9.16	10.05	10.05

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	93.0
75% of Pull at Maximum Power—Ten Hours	93.0
50% of Pull at Maximum Power—Two Hours	92.0
50% of Pull at Reduced Engine Speed—Two Hours	89.5
Bystander in 16th (8H) gear	85.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 16.9-28, 6, 16 *(110)*	Two 16.9-28, 6, 16 *(110)*
Ballast	—Liquid (each)	395 lb *(179 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 7.50-16, 6, 44 *(303)*	Two 7.50-16, 6, 44 *(303)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	25 lb *(11 kg)*	None
Height of Drawbar		19.5 in *(495 mm)*	19.5 in *(495 mm)*
Static Weight with Operator—Rear		3840 lb *(1742 kg)*	3070 lb *(1393 kg)*
—Front		2090 lb *(948 kg)*	2040 lb *(925 kg)*
—Total		5930 lb *(2690 kg)*	5110 lb *(2318 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 140°F *(60.0°C)*. Eight gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1469.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

John Deere 2150 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1470 — JOHN DEERE 2350 DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—567 rpm)								
56.18 *(41.89)*	2500	3.669 *(13.889)*	0.458 *(0.279)*	15.31 *(3.016)*	184 *(84.2)*	54 *(12.5)*	75 *(23.8)*	28.850 *(97.432)*
Standard Power Take-off Speed (540 rpm)—One Hour								
55.69 *(41.53)*	2362	3.555 *(13.457)*	0.447 *(0.272)*	15.67 *(3.086)*	184 *(84.4)*	53 *(11.4)*	74 *(23.4)*	28.855 *(97.439)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
48.73 *(36.34)*	2552	3.312 *(12.537)*	0.477 *(0.290)*	14.71 *(2.899)*	182 *(83.6)*	56 *(13.1)*	78 *(25.3)*	…… ……
0.00 *(0.00)*	2636	1.412 *(5.345)*	…… ……	…… ……	179 *(81.7)*	54 *(12.5)*	76 *(24.4)*	…… ……
24.77 *(18.47)*	2604	2.356 *(8.936)*	0.667 *(0.406)*	10.51 *(2.069)*	180 *(82.5)*	52 *(10.8)*	73 *(22.8)*	…… ……
56.96 *(42.47)*	2498	3.693 *(13.980)*	0.455 *(0.277)*	15.42 *(3.038)*	184 *(84.4)*	52 *(11.1)*	75 *(23.9)*	…… ……
12.47 *(9.30)*	2612	1.845 *(6.984)*	1.037 *(0.631)*	6.76 *(1.332)*	180 *(81.9)*	54 *(11.9)*	76 *(24.2)*	…… ……
36.89 *(27.51)*	2576	2.799 *(10.595)*	0.532 *(0.324)*	13.18 *(2.597)*	182 *(83.3)*	54 *(12.5)*	76 *(24.4)*	…… ……
Av 29.97 Av *(22.35)*	2578	2.570 *(9.728)*	0.601 *(0.366)*	11.66 *(2.297)*	181 *(82.9)*	54 *(12.0)*	76 *(24.2)*	28.900 *(97.557)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 9th (5L) Gear											
46.66 *(34.80)*	3674 *(16.34)*	4.76 *(7.67)*	2490	7.60	3.602 *(13.635)*	0.541 *(0.329)*	12.[illegible] *([illegible])*	185 *(85.0)*	47 *(8.1)*	56 *(13.3)*	28.885 *(97.540)*
75% of Pull at Maximum Power—Ten Hours 9th (5L) Gear											
37.26 *(27.78)*	2790 *(12.41)*	5.01 *(8.06)*	2567	5.47	3.[illegible] *(11.880)*	0.590 *(0.359)*	11.87 *(2.339)*	185 *(84.8)*	51 *(10.4)*	61 *(16.0)*	28.760 *(97.118)*
50% of Pull at Maximum Power—Two Hours 9th (5L) Gear											
25.53 *(19.04)*	1860 *(8.27)*	5.15 *(8.28)*	2580	3.63	2.586 *(9.788)*	0.710 *(0.432)*	9.87 *(1.945)*	184 *(84.4)*	49 *(9.4)*	61 *(16.1)*	28.885 *(97.540)*
50% of Pull at Reduced Engine Speed—Two Hours 12th (6H) Gear											
25.51 *(19.03)*	1861 *(8.28)*	5.14 *(8.27)*	1460	3.56	1.801 *(6.818)*	0.495 *(0.301)*	14.16 *(2.790)*	184 *(84.2)*	51 *(10.8)*	65 *(18.3)*	28.870 *(97.490)*
MAXIMUM POWER IN SELECTED GEARS											
39.23 *(29.27)*	5688 *(25.30)*	2.59 *(4.16)*	2541	14.76	5th (3L) Gear			184 *(84.2)*	43 *(6.1)*	47 *(8.3)*	28.870 *(97.490)*
44.98 *(33.54)*	5005 *(22.26)*	3.37 *(5.42)*	2500	11.30	6th (3H) Gear			184 *(84.4)*	45 *(7.2)*	51 *(10.6)*	28.800 *(97.523)*
46.22 *(34.46)*	4817 *(21.43)*	3.60 *(5.79)*	2499	10.66	7th (4L) Gear			185 *(85.0)*	44 *(6.7)*	48 *(8.9)*	28.610 *(96.882)*
46.75 *(34.86)*	3692 *(16.42)*	4.75 *(7.64)*	2499	7.32	8th (4H) Gear			186 *(85.3)*	45 *(7.2)*	49 *(9.4)*	28.600 *(96.848)*
47.35 *(35.31)*	3719 *(16.54)*	4.77 *(7.68)*	2500	7.44	9th (5L) Gear			186 *(85.3)*	45 *(7.2)*	48 *(8.9)*	28.600 *(96.848)*
47.28 *(35.26)*	2860 *(12.72)*	6.20 *(9.97)*	2498	5.46	10th (5H) Gear			185 *(85.0)*	45 *(7.2)*	49 *(9.4)*	28.600 *(96.848)*
47.53 *(35.44)*	2634 *(11.72)*	6.77 *(10.89)*	2499	5.08	11th (6L) Gear			185 *(85.0)*	44 *(6.7)*	48 *(8.9)*	28.610 *(96.882)*
46.94 *(35.00)*	2016 *(8.97)*	8.73 *(14.05)*	2500	3.86	12th (6H) Gear			185 *(85.0)*	44 *(6.7)*	48 *(8.9)*	28.610 *(96.882)*

Department of Agricultural Engineering

Dates of Test: April 12 to May 5, 1983

Manufacturer: JOHN DEERE WERKE MANNHEIM, Mannheim, West Germany

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8420 **Fuel weight** 7.010 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 1.718 gal *(6.502 l)* **Drained from motor** 1.334 gal *(5.048 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 39.5 hours.

ENGINE: Make John Deere Diesel **Type** four cylinder vertical **Serial No.** 4239DL07557761CD **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 4.19" x 4.33" *(106.5 mm x 110 mm)* **Compression ratio** 16.8 to 1 **Displacement** 239 cu in *(3920 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and one mesh strainer **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *L02350T466897* **Tread width** rear 59.8" *(1519 mm)* to 96.1" *(2440 mm)* front 57.6" *(1462 mm)* to 79.1" *(2008 mm)* **Wheel base** 89.2" *(2266 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 29.2" *(741 mm)* Vertical distance above roadway 33.5" *(851 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.5 *(2.4)* second 1.9 *(3.1)* third 2.1 *(3.4)* fourth 2.7 *(4.3)* fifth 3.0 *(4.9)* sixth 3.8 *(6.2)* seventh 4.1 *(6.6)* eighth 5.2 *(8.3)* ninth 5.2 *(8.4)* tenth 6.6 *(10.7)* eleventh 7.2 *(11.6)* twelfth 9.2 *(14.8)* thirteenth 10.4 *(16.7)* fourteenth 13.2 *(21.2)* fifteenth 14.0 *(22.5)* sixteenth 17.8 *(28.6)* reverse 2.3 *(3.8)*, 3.0 *(4.8)*, 3.2 *(5.2)*, 4.1 *(6.6)*, 4.6 *(7.5)*, 5.9 *(9.5)*, 6.3 *(10.1)*, 8.0 *(12.8)* **Clutch** single dry disc operated by foot pedal **Brakes** wet disc hydraulically actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 131.0" *(3.33 m)* left 131.0" *(3.33 m)* (on concrete surface without brake) right 147.0" *(3.73 m)* left 147.0" *(3.73 m)* **Turning space diameter** (on concrete surface with brake applied) right 271.0" *(6.88 m)* left 271.0" *(6.88 m)* (on concrete surface without brake) right 303.0" *(7.70 m)* left 303.0" *(7.70 m)* **Power take-off** 540 rpm at 2362 engine rpm.

LUGGING ABILITY IN 9th (5L) GEAR

Crankshaft Speed rpm	2500	2251	2004	1749	1501	1249	1003
Pull—lbs *(kN)*	3719 *(16.54)*	3960 *(17.61)*	4243 *(18.87)*	4471 *(19.89)*	4650 *(20.68)*	4719 *(20.99)*	4570 *(20.33)*
Increase in Pull %	0	6	14	20	25	27	23
Power—Hp *(kW)*	47.35 *(35.31)*	45.10 *(33.63)*	42.69 *(31.84)*	38.94 *(29.03)*	34.50 *(25.73)*	29.03 *(21.64)*	22.69 *(16.92)*
Speed—Mph *(km/h)*	4.77 *(7.68)*	4.27 *(6.87)*	3.77 *(6.07)*	3.27 *(5.26)*	2.78 *(4.48)*	2.31 *(3.71)*	1.86 *(3.00)*
Slip %	7.44	7.99	8.70	9.40	10.09	10.32	9.86

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	94.5
75% of Pull at Maximum Power—Ten Hours	93.5
50% of Pull at Maximum Power—Two Hours	93.0
50% of Pull at Reduced Engine Speed—Two Hours	88.5
Bystander in 16th (8H) gear	86.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 16.9-30; 6; 16 *(110)*	Two 16.9-30; 6; 16 *(110)*
Ballast	—Liquid (each)	170 lb *(77 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 7.50-16; 6; 44 *(303)*	Two 7.50-16; 6; 44 *(303)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	20 lb *(9 kg)*	None
Height of Drawbar		19 in *(483 mm)*	19 in *(483 mm)*
Static Weight with Operator	—Rear	4980 lb *(2259 kg)*	4640 lb *(2105 kg)*
	—Front	2210 lb *(1002 kg)*	2170 lb *(984 kg)*
	—Total	7190 lb *(3261 kg)*	6810 lb *(3089 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 141°F *(60.6°C)*. Eight gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1470**.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

John Deere 2350 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1471 — JOHN DEERE 2550 DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—567 rpm)								
65.94 *(49.17)*	2500	4.408 *(16.686)*	0.469 *(0.285)*	14.96 *(2.947)*	186 *(85.5)*	53 *(11.9)*	73 *(22.7)*	29.043 *(98.075)*
Standard Power Take-off Speed (540 rpm)—One Hour								
65.53 *(48.87)*	2382	4.250 *(16.088)*	0.455 *(0.277)*	15.42 *(3.038)*	186 *(85.3)*	53 *(11.6)*	75 *(23.7)*	29.040 *(98.064)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
57.46 *(42.85)*	2564	3.924 *(14.854)*	0.479 *(0.291)*	14.64 *(2.885)*	184 *(84.4)*	56 *(13.3)*	75 *(23.9)*	....
0.00 *(0.00)*	2612	1.605 *(6.076)*	....	....	180 *(82.2)*	53 *(11.7)*	74 *(23.6)*	....
28.94 *(21.58)*	2580	2.568 *(9.721)*	0.622 *(0.378)*	11.27 *(2.220)*	182 *(83.1)*	53 *(11.7)*	74 *(23.6)*	....
65.95 *(49.18)*	2500	4.399 *(16.652)*	0.468 *(0.284)*	14.99 *(2.953)*	186 *(85.6)*	52 *(11.4)*	75 *(23.9)*	....
14.61 *(10.89)*	2604	2.063 *(7.809)*	0.990 *(0.602)*	7.08 *(1.395)*	180 *(82.2)*	52 *(11.4)*	75 *(23.9)*	....
43.35 *(32.33)*	2578	3.193 *(12.087)*	0.516 *(0.314)*	13.58 *(2.675)*	183 *(83.9)*	54 *(12.5)*	75 *(23.9)*	....
Av 35.06 *Av (26.14)*	2573	2.959 *(11.201)*	0.592 *(0.360)*	11.85 *(2.334)*	182 *(83.4)*	54 *(12.4)*	75 *(23.8)*	28.975 *(97.844)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 9th (5L) Gear											
55.38 *(41.29)*	4322 *(19.23)*	4.80 *(7.73)*	2500	6.86	4.315 *(16.335)*	0.546 *(0.332)*	12.83 *(2.528)*	189 *(86.9)*	46 *(7.5)*	52 *(11.1)*	28.820 *(97.321)*
75% of Pull at Maximum Power—Ten Hours 9th (5L) Gear											
44.10 *(32.89)*	3269 *(14.54)*	5.06 *(8.14)*	2502	5.06	3.648 *(13.811)*	0.580 *(0.353)*	12.09 *(2.381)*	187 *(86.3)*	48 *(8.9)*	55 *(12.8)*	28.805 *(97.263)*
50% of Pull at Maximum Power—Two Hours 9th (5L) Gear											
30.25 *(22.55)*	2189 *(9.74)*	5.18 *(8.34)*	25[illegible]	3.36	2.996 *(11.340)*	0.694 *(0.422)*	10.10 *(1.989)*	186 *(85.6)*	52 *(10.8)*	61 *(15.8)*	28.805 *(97.270)*
50% of Pull at Reduced Engine Speed—Two Hours 12th (6H) Gear											
30.22 *(22.54)*	2188 *(9.73)*	5.18 *(8.34)*	1476	3.29	2.069 *(7.830)*	0.480 *(0.292)*	14.61 *(2.878)*	187 *(86.1)*	56 *(13.1)*	67 *(19.4)*	28.755 *(97.101)*
MAXIMUM POWER IN SELECTED GEARS											
48.67 *(36.29)*	6979 *(31.04)*	2.62 *(4.21)*	2500	14.00		5th (3L) Gear		188 *(86.4)*	43 *(6.1)*	47 *(8.3)*	28.850 *(97.355)*
52.95 *(39.47)*	5884 *(26.17)*	3.37 *(5.43)*	2502	11.51		6th (3H) Gear		189 *(87.2)*	57 *(13.9)*	66 *(18.9)*	28.780 *(97.186)*
53.98 *(40.25)*	5595 *(24.89)*	3.62 *(5.82)*	2501	10.33		7th (4L) Gear		189 *(86.9)*	57 *(13.9)*	66 *(18.9)*	28.780 *(97.186)*
55.05 *(41.04)*	4329 *(19.25)*	4.77 *(7.67)*	2497	7.06		8th (4H) Gear		189 *(87.2)*	57 *(13.9)*	66 *(18.9)*	28.780 *(97.186)*
56.15 *(41.86)*	4379 *(19.48)*	4.81 *(7.74)*	2501	6.86		9th (5L) Gear		188 *(86.7)*	44 *(6.7)*	50 *(10.0)*	28.820 *(97.321)*
56.24 *(41.94)*	3390 *(15.08)*	6.22 *(10.01)*	2500	5.23		10th (5H) Gear		189 *(87.2)*	58 *(14.4)*	65 *(18.3)*	28.770 *(97.152)*
55.93 *(41.71)*	3086 *(13.72)*	6.80 *(10.94)*	2500	4.60		11th (6L) Gear		189 *(87.2)*	57 *(13.9)*	65 *(18.3)*	28.770 *(97.152)*
55.13 *(41.11)*	2361 *(10.50)*	8.76 *(14.09)*	2499	3.54		12th (6H) Gear		189 *(87.2)*	57 *(13.9)*	65 *(18.3)*	28.770 *(97.152)*

Department of Agricultural Engineering

Dates of Test: April 11 to May 3, 1983

Manufacturer: JOHN DEERE WERKE MANNHEIM, Mannheim, West Germany

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8420 **Fuel weight** 7.010 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 1.635 gal *(6.188 l)* **Drained from motor** 1.197 gal *(4.531 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 37.5 hours.

ENGINE: Make John Deere Diesel **Type** four cylinder vertical **Serial No.** 4239DL06552882CD **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 4.19" x 4.33" *(106.5 mm x 110 mm)* **Compression ratio** 16.8 to 1 **Displacement** 239 cu in *(3920 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and one mesh screen **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *L02550T466899* **Tread width** rear 65.4" *(1660 mm)* to 96.1" *(2440 mm)* front 59.4" *(1510 mm)* to 77.2" *(1962 mm)* **Wheel base** 89.2" *(2265 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 30.0" *(764 mm)* Vertical distance above roadway 33.5" *(851 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.5 *(2.4)* second 1.9 *(3.1)* third 2.1 *(3.3)* fourth 2.6 *(4.3)* fifth 3.0 *(4.8)* sixth 3.8 *(6.1)* seventh 4.0 *(6.5)* eighth 5.1 *(8.3)* ninth 5.2 *(8.3)* tenth 6.6 *(10.6)* eleventh 7.1 *(11.5)* twelfth 9.1 *(14.6)* thirteenth 10.2 *(16.5)* fourteenth 13.0 *(21.0)* fifteenth 13.8 *(22.2)* sixteenth 17.6 *(28.3)* reverse 2.3 *(3.7)*, 2.9 *(4.7)*, 3.2 *(5.1)*, 4.1 *(6.5)*, 4.6 *(7.4)*, 5.8 *(9.4)*, 6.2 *(10.0)*, 7.9 *(12.7)* **Clutch** single dry disc operated by foot pedal **Brakes** wet disc hydraulically actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 131" *(3.33 m)* left 131" *(3.33 m)* (on concrete surface without brake) right 147" *(3.73 m)* left 147" *(3.73 m)* **Turning space diameter** (on concrete surface with brake applied) right 271" *(6.88 m)* left 271" *(6.88 m)* (on concrete surface without brake) right 303" *(7.70 m)* left 303" *(7.70 m)* **Power take-off** 540 rpm at 2382 engine rpm.

LUGGING ABILITY IN 9th (5L) GEAR

Crankshaft Speed rpm	2501	2251	2004	1748	1505	1257
Pull—lbs *(kN)*	4379 *(19.48)*	4714 *(20.97)*	4978 *(22.14)*	5220 *(23.22)*	5226 *(23.25)*	5220 *(23.22)*
Increase in Pull %	0	8	14	19	19	19
Power—Hp *(kW)*	56.15 *(41.86)*	53.85 *(40.15)*	50.26 *(37.48)*	45.62 *(34.02)*	39.20 *(29.23)*	32.75 *(24.42)*
Speed—Mph *(km/h)*	4.81 *(7.74)*	4.28 *(6.89)*	3.79 *(6.09)*	3.28 *(5.27)*	2.81 *(4.53)*	2.35 *(3.79)*
Slip %	6.86	7.94	8.57	9.18	9.31	9.31

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	95.5
75% of Pull at Maximum Power—Ten Hours	95.0
50% of Pull at Maximum Power—Two Hours	93.5
50% of Pull at Reduced Engine Speed—Two Hours	89.5
Bystander in 10th (8H) gear	86.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-30; 6; 16 *(110)*	Two 18.4-30; 6; 16 *(110)*
Ballast	—Liquid (each)	762 lb *(346 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 10.00-16; 6; 32 *(220)*	Two 10.00-16; 6; 32 *(220)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	25 lb *(11 kg)*	None
Height of Drawbar		19.5 in *(495 mm)*	19.5 in *(495 mm)*
Static Weight with Operator	—Rear	6165 lb *(2797 kg)*	4640 lb *(2105 kg)*
	—Front	2320 lb *(1052 kg)*	2270 lb *(1029 kg)*
	—Total	8485 lb *(3849 kg)*	6910 lb *(3134 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 136°F *(57.8°C)*. Eight gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1471.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

John Deere 2550 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1472 — JOHN DEERE 2750 DIESEL 16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—566 rpm)								
75.35 *(56.19)*	2500	4.847 *(18.348)*	0.451 *(0.274)*	15.55 *(3.062)*	192 *(89.2)*	56 *(13.4)*	75 *(23.8)*	28.530 *(96.342)*
Standard Power Take-off Speed (540 rpm)—One Hour								
75.07 *(55.98)*	2384	4.660 *(17.640)*	0.435 *(0.265)*	16.11 *(3.173)*	191 *(88.6)*	56 *(13.3)*	75 *(23.9)*	28.520 *(96.308)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
65.80 *(49.07)*	2570	4.395 *(16.637)*	0.468 *(0.285)*	14.97 *(2.949)*	188 *(86.7)*	54 *(12.2)*	73 *(22.8)*	....
0.00 *(0.00)*	2666	1.596 *(6.042)*	....	....	181 *(82.8)*	55 *(12.8)*	74 *(23.1)*	....
33.64 *(25.09)*	2623	2.944 *(11.144)*	0.614 *(0.373)*	11.42 *(2.251)*	184 *(84.2)*	55 *(12.8)*	74 *(23.1)*	....
75.13 *(56.02)*	2502	4.806 *(18.193)*	0.448 *(0.273)*	15.63 *(3.079)*	192 *(88.9)*	57 *(13.9)*	77 *(25.0)*	....
16.93 *(12.62)*	2642	2.272 *(8.600)*	0.941 *(0.572)*	7.45 *(1.467)*	182 *(83.3)*	56 *(13.3)*	76 *(24.2)*	....
49.86 *(37.18)*	2504	3.625 *(13.722)*	0.510 *(0.310)*	13.76 *(2.710)*	184 *(84.7)*	55 *(12.8)*	74 *(23.1)*	....
Av 40.23 **Av** *(30.00)*	2585	3.273 *(12.390)*	0.570 *(0.347)*	12.29 *(2.421)*	185 *(85.1)*	55 *(12.9)*	74 *(23.5)*	28.540 *(96.375)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 9th (5L) Gear											
62.97 *(46.95)*	4984 *(22.17)*	4.74 *(7.62)*	2505	8.08	4.797 *(18.158)*	0.534 *(0.325)*	13.13 *(2.586)*	191 *(88.1)*	56 *(13.1)*	68 *(20.0)*	28.885 *(97.540)*
75% of Pull at Maximum Power—Ten Hours 9th (5L) Gear											
50.44 *(37.62)*	3782 *(16.82)*	5.00 *(8.05)*	2571	5.54	4.076 *(15.431)*	0.566 *(0.345)*	12.37 *(2.438)*	189 *(87.1)*	58 *(14.6)*	67 *(19.7)*	28.879 *(97.520)*
50% of Pull at Maximum Power—Two Hours 9th (5L) Gear											
34.87 *(26.01)*	2522 *(11.22)*	5.19 *(8.35)*	2614	3.09	3.317 *(12.555)*	0.667 *(0.406)*	10.51 *(2.071)*	188 *(86.7)*	59 *(15.0)*	73 *(22.8)*	28.850 *(97.422)*
50% of Pull at Reduced Engine Speed—Two Hours 12th (6H) Gear											
34.87 *(26.00)*	2522 *(11.22)*	5.18 *(8.34)*	1484	3.33	2.354 *(8.910)*	0.473 *(0.288)*	14.81 *(2.918)*	187 *(85.8)*	60 *(15.6)*	74 *(23.3)*	28.820 *(97.321)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
52.37 *(39.05)*	7581 *(33.72)*	2.59 *(4.17)*	2550	14.83	5th (3L) Gear	188 *(86.7)*	54 *(12.2)*	59 *(15.0)*	28.850 *(97.422)*
59.42 *(44.31)*	6722 *(29.90)*	3.33 *(5.36)*	2500	12.34	6th (3H) Gear	189 *(87.2)*	50 *(10.0)*	59 *(15.0)*	28.910 *(97.625)*
61.24 *(45.66)*	6422 *(28.57)*	3.58 *(5.76)*	2499	11.07	7th (4L) Gear	189 *(86.9)*	50 *(10.0)*	59 *(15.0)*	28.920 *(97.659)*
62.87 *(46.88)*	4995 *(22.22)*	4.72 *(7.60)*	2500	7.86	8th (4H) Gear	189 *(86.9)*	49 *(9.4)*	58 *(14.4)*	28.930 *(97.693)*
63.98 *(47.71)*	5049 *(22.46)*	4.75 *(7.65)*	2497	7.54	9th (5L) Gear	190 *(87.5)*	58 *(14.4)*	61 *(16.1)*	28.910 *(97.625)*
63.53 *(47.37)*	3863 *(17.18)*	6.17 *(9.93)*	2500	5.87	10th (5H) Gear	189 *(87.2)*	50 *(10.0)*	60 *(15.6)*	28.910 *(97.625)*
63.86 *(47.62)*	3561 *(15.84)*	6.72 *(10.82)*	2498	5.41	11th (6L) Gear	189 *(87.2)*	51 *(10.6)*	61 *(16.1)*	28.900 *(97.591)*
63.40 *(47.28)*	2733 *(12.16)*	8.69 *(13.99)*	2501	4.00	12th (6H) Gear	189 *(87.2)*	52 *(11.1)*	63 *(17.2)*	28.900 *(97.591)*

Department of Agricultural Engineering

Dates of Test: April 11 to May 11, 1983

Manufacturer: JOHN DEERE WERKE MANNHEIM, Mannheim, West Germany

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8420 **Fuel weight** 7.010 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 1.826 gal *(6.913 l)* **Drained from motor** 1.333 gal *(5.047 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 41.0 hours.

ENGINE: Make John Deere Diesel **Type** four cylinder vertical with turbocharger **Serial No.** 4239TL05556351CD **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 4.19" x 4.33" *(106.5 mm x 110 mm)* **Compression ratio** 16.8 to 1 **Displacement** 239 cu in *(3920 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and one mesh strainer **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *L02750T466901* **Tread width** rear 65.4" *(1660 mm)* to 96.1" *(2440 mm)* front 59.4" *(1510 mm)* to 77.2" *(1962 mm)* **Wheel base** 89.2" *(2266 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 29.1" *(739 mm)* Vertical distance above roadway 33.5" *(851 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.5 *(2.4)* second 1.9 *(3.1)* third 2.1 *(3.3)* fourth 2.6 *(4.3)* fifth 3.0 *(4.8)* sixth 3.8 *(6.1)* seventh 4.0 *(6.5)* eighth 5.1 *(8.3)* ninth 5.1 *(8.3)* tenth 6.6 *(10.6)* eleventh 7.1 *(11.5)* twelfth 9.1 *(14.6)* thirteenth 10.2 *(16.5)* fourteenth 13.0 *(21.0)* fifteenth 13.8 *(22.2)* sixteenth 17.6 *(28.3)* reverse 2.3 *(3.7)*, 2.9 *(4.7)*, 3.2 *(5.1)*, 4.1 *(6.5)*, 4.6 *(7.4)*, 5.8 *(9.4)*, 6.2 *(10.0)*, 7.9 *(12.7)* **Clutch** single dry disc operated by foot pedal **Brakes** wet disc hydraulically actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 131.0" *(3.33 m)* left 131.0" *(3.33 m)* (on concrete surface without brake) right 150" *(3.81 m)* left 150" *(3.81 m)* **Turning space diameter** (on concrete surface with brake applied) right 274.0" *(6.96 m)* left 274.0" *(6.96 m)* (on concrete surface without brake) right 310.0" *(7.87 m)* left 310.0" *(7.87 m)* **Power take-off** 540 rpm at 2384 engine rpm.

LUGGING ABILITY IN 9th (5L) GEAR

Crankshaft Speed rpm	2497	2251	2005	1749	1503	1251
Pull—lbs *(kN)*	5049 *(22.46)*	5439 *(24.19)*	5745 *(25.56)*	5816 *(25.87)*	5654 *(25.15)*	5529 *(24.59)*
Increase in Pull %	0	8	14	15	12	10
Power—Hp *(kW)*	63.98 *(47.71)*	61.65 *(45.98)*	57.61 *(42.96)*	50.75 *(37.84)*	42.53 *(31.71)*	34.62 *(25.82)*
Speed—Mph *(km/h)*	4.75 *(7.65)*	4.25 *(6.84)*	3.76 *(6.05)*	3.27 *(5.27)*	2.82 *(4.54)*	2.35 *(3.78)*
Slip %	7.54	8.30	9.04	9.16	8.91	8.67

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	93.0
75% of Pull at Maximum Power—Ten Hours	93.5
50% of Pull at Maximum Power—Two Hours	93.5
50% of Pull at Reduced Engine Speed—Two Hours	89.5
Bystander in 16th (8H) gear	85.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-30; 6; 16 *(110)*	Two 18.4-30; 6; 16 *(110)*
Ballast	—Liquid (each)	1032 lb *(468 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 10.00-16; 6; 32 *(220)*	Two 10.00-16; 6; 32 *(220)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	50 lb *(74 kg)*	None
Height of Drawbar		19.5 in *(495 mm)*	19.5 in *(495 mm)*
Static Weight with Operator—Rear		7175 lb *(3255 kg)*	5110 lb *(2318 kg)*
—Front		2450 lb *(1111 kg)*	2390 lb *(1084 kg)*
—Total		9625 lb *(4366 kg)*	7500 lb *(3402 kg)*

John Deere 2750 Diesel

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 142°F *(61.1°C)*. Eight gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1472**.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station,
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1473 — JOHN DEERE 2950 DIESEL 16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1030 rpm)								
85.37 *(63.66)*	2500	5.398 *(20.434)*	0.443 *(0.270)*	15.82 *(3.115)*	184 *(84.2)*	52 *(10.8)*	75 *(23.9)*	28.843 *(97.400)*
Standard Power Take-off Speed (1000 rpm)—One Hour								
85.50 *(63.76)*	2407	5.237 *(19.824)*	0.429 *(0.261)*	16.33 *(3.216)*	183 *(84.1)*	50 *(10.2)*	74 *(23.6)*	28.820 *(97.321)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
74.37 *(55.46)*	2563	4.937 *(18.689)*	0.465 *(0.283)*	15.06 *(2.968)*	178 *(81.4)*	52 *(10.8)*	76 *(24.2)*	....
0.00 *(0.00)*	2650	1.938 *(7.336)*	....	....	172 *(78.1)*	52 *(11.1)*	74 *(23.6)*	....
37.83 *(28.21)*	2607	3.359 *(12.715)*	0.622 *(0.379)*	11.26 *(2.219)*	176 *(80.0)*	51 *(10.6)*	72 *(22.2)*	....
86.14 *(64.23)*	2500	5.382 *(20.373)*	0.438 *(0.267)*	16.01 *(3.153)*	184 *(84.2)*	51 *(10.6)*	73 *(22.8)*	....
19.06 *(14.21)*	2626	2.648 *(10.024)*	0.974 *(0.593)*	7.20 *(1.418)*	174 *(78.6)*	51 *(10.6)*	74 *(23.1)*	....
56.22 *(41.92)*	2584	4.137 *(15.660)*	0.516 *(0.314)*	13.59 *(2.677)*	178 *(80.8)*	52 *(10.8)*	76 *(24.2)*	....
Av 45.60 Av *(34.00)*	2588	3.734 *(14.135)*	0.574 *(0.349)*	12.21 *(2.405)*	177 *(80.5)*	51 *(10.7)*	74 *(23.3)*	28.840 *(97.388)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 9th (5L) Gear											
72.12 *(53.78)*	5328 *(23.70)*	5.08 *(8.17)*	2501	6.57	5.312 *(20.109)*	0.517 *(0.314)*	13.58 *(2.674)*	187 *(86.1)*	60 *(15.6)*	75 *(23.6)*	28.535 *(96.350)*
75% of Pull at Maximum Power—Ten Hours 9th (5L) Gear											
57.66 *(43.00)*	4048 *(18.01)*	5.34 *(8.60)*	2582	4.76	4.631 *(17.532)*	0.563 *(0.343)*	12.45 *(2.453)*	181 *(82.9)*	48 *(8.8)*	56 *(13.4)*	28.850 *(97.422)*
50% of Pull at Maximum Power—Two Hours 9th (5L) Gear											
39.43 *(29.40)*	2700 *(12.01)*	5.48 *(8.82)*	2606	3.33	3.744 *(14.171)*	0.666 *(0.405)*	10.53 *(2.073)*	180 *(82.2)*	49 *(9.4)*	52 *(10.8)*	28.815 *(97.304)*
50% of Pull at Reduced Engine Speed—Two Hours 12th (6H) Gear											
39.53 *(29.48)*	2700 *(12.01)*	5.49 *(8.84)*	1495	3.21	2.727 *(10.322)*	0.484 *(0.294)*	14.49 *(2.855)*	181 *(82.5)*	53 *(11.4)*	57 *(13.9)*	28.815 *(97.304)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
63.90 *(47.65)*	8768 *(39.00)*	2.73 *(4.40)*	2506	14.99	5th (3L) Gear	180 *(82.2)*	43 *(6.1)*	44 *(6.7)*	28.810 *(97.287)*
69.64 *(51.93)*	7228 *(32.15)*	3.61 *(5.81)*	2499	9.81	6th (3H) Gear	184 *(84.2)*	58 *(14.4)*	67 *(19.4)*	28.470 *(96.139)*
71.27 *(53.15)*	6920 *(30.78)*	3.86 *(6.22)*	2501	9.05	7th (4L) Gear	184 *(84.2)*	57 *(13.9)*	65 *(18.3)*	28.460 *(96.105)*
72.01 *(53.69)*	5344 *(23.77)*	5.05 *(8.13)*	2497	6.39	8th (4H) Gear	184 *(84.2)*	56 *(13.3)*	63 *(17.2)*	28.450 *(96.071)*
73.06 *(54.48)*	5397 *(24.00)*	5.08 *(8.17)*	2501	6.46	9th (5L) Gear	187 *(86.1)*	60 *(15.6)*	74 *(23.3)*	28.530 *(96.342)*
73.50 *(54.80)*	4181 *(18.60)*	6.57 *(10.58)*	2499	4.80	10th (5H) Gear	185 *(84.7)*	59 *(15.0)*	68 *(20.0)*	28.480 *(96.173)*
73.11 *(54.52)*	3818 *(16.98)*	7.18 *(11.56)*	2501	4.34	11th (6L) Gear	186 *(85.5)*	60 *(15.6)*	70 *(21.1)*	28.490 *(96.206)*
71.64 *(53.42)*	2911 *(12.95)*	9.23 *(14.85)*	2501	3.24	12th (6H) Gear	186 *(85.5)*	60 *(15.6)*	71 *(21.7)*	28.500 *(96.240)*

Department of Agricultural Engineering

Dates of Test: April 18 to May 2, 1983

Manufacturer: JOHN DEERE WERKE MANNHEIM, Mannheim, West Germany

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8421 **Fuel weight** 7.012 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 2.581 gal *(9.772 l)* **Drained from motor** 2.091 gal *(7.916 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 37.0 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical **Serial No.** 6359DL04554662CD **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 4.19" x 4.33" *(106.5 mm x 110 mm)* **Compression ratio** 16.8 to 1 **Displacement** 359 cu in *(5883 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and one mesh screen **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: Type standard **Serial No.** *L02950T466905* **Tread width** rear 61.8" *(1570 mm)* to 94.9" *(2410 mm)* front 58.3" *(1482 mm)* to 80.3" *(2040 mm)* **Wheel base** 100.4" *(2551 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 30.5" *(776 mm)* Vertical distance above roadway 40" *(1016 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.6 *(2.5)* second 2.0 *(3.2)* third 2.2 *(3.5)* fourth 2.8 *(4.5)* fifth 3.1 *(5.0)* sixth 4.0 *(6.4)* seventh 4.2 *(6.8)* eighth 5.4 *(8.7)* ninth 5.4 *(8.7)* tenth 6.9 *(11.1)* eleventh 7.5 *(12.0)* twelfth 9.5 *(15.3)* thirteenth 10.7 *(17.3)* fourteenth 13.7 *(22.0)* fifteenth 14.5 *(23.3)* sixteenth 18.4 *(29.7)* reverse 2.4 *(3.9)*, 3.1 *(5.0)*, 3.4 *(5.4)*, 4.3 *(6.9)*, 4.8 *(7.7)*, 6.1 *(9.9)*, 6.5 *(10.4)*, 8.3 *(13.3)* **Clutch** single dry disc operated by foot pedal **Brakes** wet disc hydraulically actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 144" *(3.66 m)* left 144" *(3.66 m)* (on concrete surface without brake) right 166" *(4.22 m)* left 166" *(4.22 m)* **Turning space diameter** (on concrete surface with brake applied) right 299" *(7.59 m)* left 299" *(7.59 m)* (on concrete surface without brake) right 343" *(8.71 m)* left 343" *(8.71 m)* **Power take-off** 540 rpm at 2415 engine rpm and 1000 rpm at 2407 engine rpm.

LUGGING ABILITY IN 9th (5L) GEAR

Crankshaft Speed rpm	2501	2251	2000	1758	1502	1251
Pull—lbs *(kN)*	5397 *(24.00)*	5833 *(25.95)*	6214 *(27.64)*	6465 *(28.76)*	6431 *(28.61)*	6399 *(28.46)*
Increase in Pull %	0	8	15	20	19	19
Power—Hp *(kW)*	73.06 *(54.48)*	70.76 *(52.76)*	66.56 *(49.63)*	60.58 *(45.18)*	51.47 *(38.38)*	42.67 *(31.82)*
Speed—Mph *(km/h)*	5.08 *(8.17)*	4.55 *(7.32)*	4.02 *(6.46)*	3.51 *(5.66)*	3.00 *(4.83)*	2.50 *(4.02)*
Slip %	6.46	6.97	7.70	7.99	7.99	8.13

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—Two Hours	76.0
75% of Pull at Maximum Power—Ten Hours	76.0
50% of Pull at Maximum Power—Two Hours	75.5
50% of Pull at Reduced Engine Speed—Two Hours	70.5
Bystander in 16th (8H) gear	88.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-38; 8; 16 *(110)*	Two 18.4-38; 8; 16 *(110)*
Ballast	—Liquid (each)	445 lb *(202 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 10.00-16; 6; 32 *(220)*	Two 10.00-16; 6; 32 *(220)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	28 lb *(12 kg)*	None
Height of Drawbar		23.5 in *(595 mm)*	23.5 in *(595 mm)*
Static Weight with Operator	—Rear	7970 lb *(3615 kg)*	7080 lb *(3211 kg)*
	—Front	3075 lb *(1395 kg)*	3020 lb *(1370 kg)*
	—Total	11045 lb *(5010 kg)*	10100 lb *(4581 kg)*

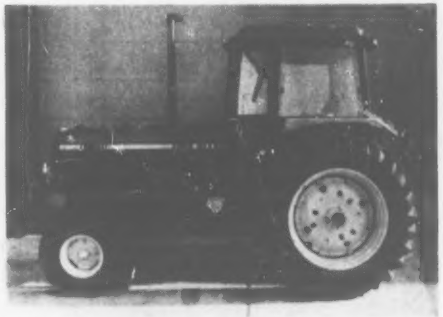
REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 118°F *(47.8°C)*. Eight gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. During final inspection, the No. 5 piston was found to have an imprint of the exhaust valve. The imprint showed some pitting.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1473.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



John Deere 2950 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1474
JOHN DEERE 4050 QUADRANGE DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1002 rpm)								
101.49 (75.68)	2200	6.714 (25.414)	0.464 (0.282)	15.12 (2.978)	192 (89.2)	68 (20.1)	74 (23.6)	29.000 (97.929)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
88.79 (66.21)	2267	6.147 (23.269)	0.485 (0.295)	14.44 (2.845)	188 (86.7)	70 (21.1)	77 (25.0)	....
0.00 (0.00)	2374	2.496 (9.448)	....	....	175 (79.4)	70 (21.1)	76 (24.4)	....
45.57 (33.98)	2321	4.191 (15.865)	0.644 (0.392)	10.87 (2.142)	182 (83.3)	68 (20.3)	74 (23.6)	....
101.75 (75.87)	2200	6.657 (25.199)	0.458 (0.279)	15.29 (3.011)	194 (90.0)	70 (21.1)	76 (24.4)	....
23.06 (17.20)	2348	3.352 (12.689)	1.019 (0.620)	6.88 (1.356)	177 (80.6)	68 (20.0)	74 (23.1)	....
67.40 (50.26)	2292	5.026 (19.025)	0.523 (0.318)	13.41 (2.642)	187 (86.1)	70 (21.1)	76 (24.4)	....
Av 54.43 Av (40.59)	2300	4.645 (17.583)	0.598 (0.364)	11.72 (2.308)	184 (84.3)	69 (20.8)	76 (24.2)	28.993 (97.903)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 7th (B2) Gear											
90.38 (67.40)	6254 (27.82)	5.42 (8.72)	2199	5.31	6.724 (25.455)	0.521 (0.317)	13.44 (2.648)	193 (89.4)	42 (5.6)	50 (9.7)	29.070 (98.165)
75% of Pull at Maximum Power—Ten Hours 7th (B2) Gear											
71.96 (53.66)	4725 (21.02)	5.71 (9.19)	2274	3.66	5.736 (21.714)	0.559 (0.340)	12.54 (2.471)	187 (86.2)	38 (3.4)	47 (8.1)	29.021 (98.000)
50% of Pull at Maximum Power—Two Hours 7th (B2) Gear											
49.14 (36.64)	3150 (14.01)	5.85 (9.41)	2304	2.60	4.620 (17.488)	0.659 (0.401)	10.64 (2.095)	182 (83.1)	32 (-0.3)	35 (1.7)	28.860 (97.456)
50% of Pull at Reduced Engine Speed—Two Hours 12th (B4) Gear											
49.16 (36.66)	3150 (14.01)	5.85 (9.42)	1396	2.60	3.585 (13.571)	0.511 (0.311)	13.71 (2.701)	180 (81.9)	34 (0.8)	39 (3.9)	28.860 (97.456)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
77.22 (57.58)	10331 (45.95)	2.80 (4.51)	2227	14.66	3rd (A3) Gear	187 (85.8)	37 (2.8)	40 (4.4)	29.050 (98.097)
88.84 (66.25)	8850 (39.36)	3.76 (6.06)	2199	8.52	4th (A4) Gear	193 (89.2)	40 (4.4)	48 (8.9)	29.080 (98.199)
90.07 (67.17)	8070 (35.90)	4.18 (6.73)	2199	7.30	5th (B1) Gear	192 (88.9)	40 (4.4)	47 (8.3)	29.070 (98.165)
90.46 (67.45)	6725 (29.91)	5.04 (8.11)	2200	5.84	6th (C1) Gear	192 (88.9)	40 (4.4)	47 (8.3)	29.070 (98.165)
91.86 (68.50)	6353 (28.26)	5.42 (8.73)	2202	5.42	7th (B2) Gear	191 (88.3)	38 (3.3)	45 (7.2)	29.070 (98.165)
92.06 (68.64)	5330 (23.66)	6.48 (10.43)	2200	4.48	8th (C2) Gear	191 (88.3)	40 (4.4)	48 (8.9)	29.080 (98.199)
90.97 (67.84)	4760 (21.21)	7.15 (11.51)	2198	4.05	9th (B3) Gear	193 (89.4)	40 (4.4)	48 (8.9)	29.080 (98.199)
89.46 (66.71)	4230 (18.82)	7.92 (12.74)	2200	3.33	10th (D1) Gear	192 (88.9)	41 (5.0)	49 (9.4)	29.080 (98.199)
88.37 (65.90)	3960 (17.63)	8.34 (13.42)	2199	3.38	11th (C3) Gear	192 (88.9)	42 (5.6)	49 (9.4)	29.080 (98.199)

Department of Agricultural Engineering

Dates of Test: April 1-19, 1983

Manufacturer: JOHN DEERE TRACTOR WORKS, P.O. Box 2[illegible], Waterloo, Iowa 50702

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8417 **Fuel weight** 7.008 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 3.916 gal *(14.824 l)* **Drained from motor** 3.519 gal *(13.321 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 39.0 hours

ENGINE: Make John Deere Diesel **Type** six cylinder vertical **Serial No.** *RG6466D241920* **Crankshaft** lengthwise **Rated rpm** 2000 to 2200 **Bore and stroke** 4.57" x 4.75" *(116.0 mm x 120.6 mm)* **Compression ratio** 17.0 to 1 **Displacement** 466 cu in *(7636 ml)* **Starting system** 12 volt **Lubrication pressure Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper cartridge and prestrainer **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: Type standard with duals **Serial No.** *RW4050H001942* **Tread width** rear 60.0" *(1524 mm)* to 114" *(2890 mm)* front 56" *(1420 mm)* to 82.6" *(2095 mm)* **Wheel base** 106.7" *(2710 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 31.5" *(800 mm)* Vertical distance above roadway 43" *(1092 mm)* Horizontal distance from center of rear wheel tread 0.4" *(10 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 1.9 *(3.1)* second 2.5 *(4.0)* third 3.2 *(5.1)* fourth 4.1 *(6.5)* fifth 4.4 *(7.2)* sixth 5.3 *(8.5)* seventh 5.6 *(9.1)* eighth 6.7 *(10.8)* ninth 7.4 *(11.8)* tenth 8.1 *(13.0)* eleventh 8.7 *(14.0)* twelfth 9.4 *(15.1)* thirteenth 10.3 *(16.6)* fourteenth 11.1 *(17.8)* fifteenth 13.4 *(21.6)* sixteenth 17.0 *(27.4)* reverse 3.1 *(5.0)*, 3.9 *(6.3)*, 7.1 *(11.5)*, 8.4 *(13.6)*, 9.1 *(14.6)*, 10.7 *(17.3)* **Clutch** wet multiple disc hydraulically power actuated and operated by foot pedal **Brakes** wet disc hydraulically power actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 146" *(3.7 m)* left 146" *(3.7 m)* (on concrete surface without brake) right 157" *(4.0 m)* left 157" *(4.0 m)* **Turning space diameter** (on concrete surface with brake applied) right 295.8" *(7.51 m)* left 295.8" *(7.51 m)* (on concrete surface without brake) right 326.9" *(8.30 m)* left 326.9" *(8.30 m)* **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm.

LUGGING ABILITY IN 7th (B2) GEAR

Crankshaft Speed rpm	2202	1982	1762	1540	1319	1105	891
Pull—lbs (kN)	6353 (28.26)	6890 (30.65)	7256 (32.28)	7680 (34.20)	8037 (35.75)	8126 (36.15)	7837 (34.86)
Increase in Pull %	0	8	14	21	27	28	23
Power—Hp (kW)	91.86 (68.50)	89.32 (66.60)	83.16 (62.01)	76.51 (57.05)	68.24 (50.89)	57.65 (42.99)	45.05 (33.59)
Speed—Mph (km/h)	5.42 (8.73)	4.86 (7.82)	4.30 (6.92)	3.73 (6.01)	3.18 (5.12)	2.66 (4.28)	2.16 (3.47)
Slip %	5.42	5.77	6.33	6.89	7.30	7.57	7.16

TRACTOR SOUND LEVEL WITH CAB	2000 RPM dB(A)	2200 RPM dB(A)
Maximum Available Power—Two Hours	75.0	74.0
75% of Pull at Maximum Power—Ten Hours		74.0
50% of Pull at Maximum Power—Two Hours		73.5
50% of Pull at Reduced Engine Speed—Two Hours		71.5
Bystander in 16th (D4) gear		89.0

SUPPLEMENTARY TESTS
POWER AND FUEL CONSUMPTION AT 2000 RPM
POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—912 rpm)								
99.95 (74.53)	2001	6.317 (23.913)	0.443 (0.269)	15.82 (3.117)	191 (88.4)	69 (20.5)	75 (23.8)	29.000 (97.929)

DRAWBAR PERFORMANCE AT 2000 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 7th (B2) Gear											
89.18 (66.50)	6820 (30.33)	4.90 (7.89)	2001	5.84	6.457 (24.442)	0.507 (0.309)	13.81 (2.721)	191 (88.3)	43 (5.8)	51 (10.3)	29.040 (98.064)

MAXIMUM POWER IN SELECTED GEAR

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
89.86 (67.01)	6876 (30.58)	4.90 (7.89)	2000	5.84	7th (B2) Gear	191 (88.3)	43 (6.1)	51 (10.6)	29.040 (98.064)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 18.4-34, 6, 12 *(83)*	Four 18.4-34, 6, 12 *(83)*
Ballast	—Liquid (each inner)	362 lb *(164 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 10.00-16, 6, 32 *(220)*	Two 10.00-16, 6, 32 *(220)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	55 lb *(25 kg)*	None
Height of Drawbar		38.2 in *(970 mm)*	38.2 in *(970 mm)*
Static Weight with Operator	—Rear	9370 lb *(4250 kg)*	8645 lb *(3921 kg)*
	—Front	3635 lb *(1649 kg)*	3525 lb *(1599 kg)*
	—Total	13005 lb *(5899 kg)*	12170 lb *(5520 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests the fuel temperature at the injection pump return was maintained at 136°F *(57.8°C)*. Nine gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1474**.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

John Deere 4050 Quadrange Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1475
JOHN DEERE 4250 QUADRANGE DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1002 rpm)								
120.21 (89.64)	2200	7.656 (28.981)	0.446 (0.272)	15.70 (3.093)	188 (86.9)	59 (15.2)	74 (23.4)	28.953 (97.771)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
104.15 (77.66)	2243	7.030 (26.611)	0.473 (0.288)	14.81 (2.918)	185 (85.0)	66 (19.2)	75 (23.9)	....
0.00 (0.00)	2340	2.513 (9.513)	....	....	172 (78.1)	66 (18.6)	74 (23.1)	....
53.32 (39.76)	2296	4.680 (17.716)	0.615 (0.374)	11.39 (2.244)	182 (83.3)	66 (18.6)	73 (22.8)	....
121.14 (90.33)	2201	7.724 (29.239)	0.447 (0.272)	15.68 (3.089)	188 (86.7)	67 (19.4)	76 (24.4)	....
26.89 (20.05)	2316	3.669 (13.889)	0.956 (0.582)	7.33 (1.444)	177 (80.6)	67 (19.4)	74 (23.6)	....
79.18 (59.04)	2274	5.891 (22.300)	0.521 (0.317)	13.44 (2.648)	184 (84.4)	66 (18.9)	74 (23.1)	....
Av 64.11 Av (47.81)	2278	5.251 (19.877)	0.574 (0.349)	12.21 (2.405)	181 (83.0)	66 (19.1)	74 (23.3)	28.970 (97.827)

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 7th (B2) Gear											
106.38 (79.33)	6977 (31.03)	5.72 (9.20)	2200	4.89	7.653 (28.970)	0.504 (0.307)	13.90 (2.738)	190 (87.5)	42 (5.3)	52 (9.7)	29.010 (97.962)
75% of Pull at Maximum Power—Ten Hours 7th (B2) Gear											
85.37 (63.66)	5354 (23.82)	5.98 (9.62)	2268	3.73	6.661 (25.215)	0.547 (0.333)	12.82 (2.525)	186 (85.5)	36 (2.1)	40 (4.3)	28.957 (97.785)
50% of Pull at Maximum Power—Two Hours 7th (B2) Gear											
57.90 (43.18)	3525 (15.58)	6.16 (9.91)	2206	2.37	5.441 (20.596)	0.658 (0.400)	10.64 (2.096)	183 (83.9)	36 (2.2)	41 (5.0)	29.000 (97.929)
50% of Pull at Reduced Engine Speed—Two Hours 12th (B4) Gear											
57.91 (43.18)	3525 (15.68)	6.16 (9.92)	1397	2.33	4.103 (15.532)	0.496 (0.302)	14.11 (2.780)	181 (82.8)	37 (2.8)	41 (5.0)	28.995 (97.912)
MAXIMUM POWER IN SELECTED GEARS											
78.41 (58.47)	12858 (57.19)	2.29 (3.68)	2256	14.83	2nd (A2) Gear			183 (83.9)	35 (1.7)	39 (3.9)	29.030 (98.030)
99.11 (73.91)	12821 (56.14)	2.94 (4.74)	2201	13.60	3rd (A3) Gear			187 (85.8)	36 (2.2)	40 (4.4)	29.040 (98.064)
106.83 (79.66)	10073 (44.80)	3.98 (6.40)	2200	8.10	4th (A4) Gear			189 (86.9)	38 (3.3)	42 (5.6)	29.050 (98.097)
106.47 (79.39)	9032 (40.18)	4.42 (7.11)	2203	6.88	5th (B1) Gear			190 (87.5)	39 (3.9)	44 (6.7)	29.050 (98.097)
107.27 (79.99)	7574 (33.69)	5.31 (8.55)	2200	5.41	6th (C1) Gear			190 (87.5)	40 (4.4)	47 (8.3)	29.050 (98.097)
108.77 (81.11)	7139 (31.76)	5.71 (9.20)	2200	5.11	7th (B2) Gear			189 (87.2)	40 (4.4)	45 (7.2)	29.050 (98.097)
108.29 (80.75)	5937 (26.41)	6.84 (11.01)	2201	4.20	8th (C2) Gear			190 (87.5)	40 (4.4)	47 (8.3)	29.050 (98.097)
106.78 (79.62)	5310 (23.62)	7.54 (12.14)	2199	3.50	9th (B3) Gear			190 (87.5)	40 (4.4)	48 (8.9)	29.040 (98.064)
105.13 (78.40)	4724 (21.01)	8.35 (13.43)	2199	3.20	10th (D1) Gear			190 (87.5)	40 (4.4)	48 (8.9)	29.040 (98.064)

Department of Agricultural Engineering

Dates of Test: March 31 to April 12, 1983

Manufacturer: JOHN DEERE TRACTOR WORKS, P.O. Box 270, Waterloo, Iowa 50702

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8416 **Fuel weight** 7.007 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 3.977 gal *(15.056 l)* **Drained from motor** 3.739 gal *(14.152 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 42.5 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6466T242624* **Crankshaft** lengthwise **Rated rpm** 2000 to 2200 **Bore and stroke** 4.57" x 4.75" *(116.0 mm x 120.6 mm)* **Compression ratio** 15.8 to 1 **Displacement** 466 cu in *(7634 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements with prestrainer **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: Type standard with duals **Serial No.** *RW4250H002243* **Tread width** rear 60" *(1524 mm)* to 114" *(2890 mm)* front 56" *(1420 mm)* to 82.6" *(2099 mm)* **Wheel base** 106.7" *(2710 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 29.5" *(749 mm)* Vertical distance above roadway 45.0" *(1143 mm)* Horizontal distance from center of rear wheel tread 0.4" *(10 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph (km/h)** first 2.1 *(3.4)* second 2.6 *(4.3)* third 3.4 *(5.5)* fourth 4.4 *(7.0)* fifth 4.8 *(7.7)* sixth 5.7 *(9.1)* seventh 6.1 *(9.8)* eighth 7.2 *(11.6)* ninth 7.9 *(12.7)* tenth 8.7 *(14.0)* eleventh 9.4 *(15.1)* twelfth 10.1 *(16.2)* thirteenth 11.1 *(17.8)* fourteenth 11.9 *(19.2)* fifteenth 14.4 *(23.2)* sixteenth 18.3 *(29.4)* reverse 3.3 *(5.4)*, 4.2 *(6.8)*, 7.7 *(12.3)*, 9.1 *(14.6)*, 9.7 *(15.7)*, 11.5 *(18.6)* **Clutch** wet multiple disc hydraulically power actuated and operated by foot pedal **Brakes** wet disc hydraulically power actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 146" *(3.7 m)* left 146" *(3.7 m)* (on concrete surface without brake) right 157" *(4.0 m)* left 157" *(4.0 m)* **Turning space diameter** (on concrete surface with brake applied) right 302" *(7.67 m)* left 302" *(7.67 m)* (on concrete surface without brake) right 338" *(8.58 m)* left 338" *(8.58 m)* **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm.

LUGGING ABILITY IN 7th (B2) GEAR

Crankshaft Speed rpm	2200	1981	1766	1545	1327	1104
Pull—lbs (kN)	7139 (31.76)	8148 (36.24)	9059 (40.30)	9548 (42.47)	9282 (41.29)	9090 (40.43)
Increase in Pull %	0	14	27	34	30	27
Power—Hp (kW)	108.77 (81.11)	110.51 (82.41)	108.76 (81.10)	98.85 (73.71)	83.42 (62.21)	68.09 (50.78)
Speed—Mph (km/h)	5.71 (9.20)	5.09 (8.19)	4.50 (7.25)	3.88 (6.25)	3.37 (5.42)	2.81 (4.52)
Slip %	5.11	6.01	6.74	7.89	7.03	7.03

TRACTOR SOUND LEVEL WITH CAB	2000 RPM dB(A)	2200 RPM dB(A)
Maximum Available Power—Two Hours	74.0	74.0
75% of Pull at Maximum Power—Ten Hours		73.5
50% of Pull at Maximum Power—Two Hours		74.0
50% of Pull at Reduced Engine Speed—Two Hours		72.0
Bystander in 16th (D4) gear		87.0

SUPPLEMENTARY TESTS
POWER AND FUEL CONSUMPTION AT 2000 RPM
POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—912 rpm)								
123.06 (91.77)	2001	7.448 (28.194)	0.424 (0.258)	16.52 (3.255)	188 (86.7)	66 (18.9)	75 (24.1)	28.955 (97.777)

DRAWBAR PERFORMANCE AT 2000 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (B2) Gear											
110.04 (82.05)	8006 (35.61)	5.15 (8.29)	1999	5.79	7.546 (28.565)	0.481 (0.292)	14.58 (2.873)	191 (88.1)	42 (5.3)	51 (10.3)	28.960 (97.794)
MAXIMUM POWER IN SELECTED GEAR											
110.90 (82.70)	8082 (35.95)	5.15 (8.28)	1999	5.86	7th (B2) Gear			191 (88.1)	40 (4.4)	46 (7.8)	29.050 (98.097)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi (kPa)	Four 18.4-38; 6; 12 (85)	Four 18.4-38; 6; 12 (85)
Ballast	—Liquid (each inner)	737 lb (335 kg)	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi (kPa)	Two 11.00-16; 8; 36 (250)	Two 11.00-16; 8; 36 (250)
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	73 lb (33 kg)	None
Height of Drawbar		24 in (610 mm)	24 in (610 mm)
Static Weight with Operator	—Rear	11145 lb (5055 kg)	9670 lb (4386 kg)
	—Front	3845 lb (1744 kg)	3700 lb (1678 kg)
	—Total	14990 lb (6799 kg)	13370 lb (6064 kg)

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 119°F *(48.5°C)*. Nine gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1475**.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

John Deere 4250 Quadrange Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1476
JOHN DEERE 4450 QUADRANGE DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1002 rpm)								
140.33 *(104.64)*	2200	8.580 *(32.479)*	0.428 *(0.261)*	16.36 *(3.222)*	202 *(94.5)*	67 *(19.7)*	74 *(23.6)*	28.923 *(97.670)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
121.61 *(90.68)*	2242	7.762 *(29.382)*	0.447 *(0.272)*	15.67 *(3.086)*	197 *(91.7)*	67 *(19.4)*	74 *(23.6)*	....
0.00 *(0.00)*	2329	2.466 *(9.335)*	....	....	176 *(79.7)*	68 *(19.7)*	74 *(23.1)*	....
61.96 *(46.20)*	2284	5.065 *(19.173)*	0.573 *(0.348)*	12.23 *(2.410)*	186 *(85.8)*	70 *(20.8)*	76 *(24.4)*	....
139.75 *(104.21)*	2200	8.559 *(32.399)*	0.429 *(0.261)*	16.33 *(3.216)*	201 *(93.9)*	70 *(20.8)*	78 *(25.3)*	....
31.22 *(23.28)*	2302	3.840 *(14.536)*	0.862 *(0.524)*	8.13 *(1.602)*	180 *(82.2)*	68 *(20.0)*	76 *(24.2)*	....
92.10 *(68.68)*	2264	6.452 *(24.423)*	0.491 *(0.299)*	14.27 *(2.812)*	192 *(88.9)*	69 *(20.6)*	76 *(24.4)*	....
Av 74.44 **Av *(55.51)***	**2270**	**5.691** ***(21.343)***	**0.536** ***(0.326)***	**13.08** ***(2.577)***	**189** ***(87.1)***	**68** ***(20.2)***	**76** ***(24.2)***	**28.937** ***(97.715)***

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 6th (C1) Gear											
120.11 *(89.56)*	8954 *(39.83)*	5.03 *(8.10)*	2201	5.02	8.331 *(31.536)*	0.486 *(0.296)*	14.42 *(2.840)*	201 *(93.6)*	48 *(8.6)*	59 *(15.0)*	28.710 *(96.949)*
75% of Pull at Maximum Power—Ten Hours 6th (C1) Gear											
97.87 *(72.98)*	7022 *(31.24)*	5.23 *(8.41)*	2260	4.00	7.278 *(27.552)*	0.521 *(0.317)*	13.45 *(2.649)*	193 *(89.7)*	51 *(10.5)*	54 *(12.0)*	28.264 *(95.443)*
50% of Pull at Maximum Power—Two Hours 6th (C1) Gear											
67.12 *(50.05)*	4682 *(20.83)*	5.38 *(8.65)*	2292	2.65	5.780 *(21.879)*	0.603 *(0.367)*	11.61 *(2.288)*	187 *(86.1)*	36 *(2.2)*	38 *(3.3)*	28.550 *(96.409)*
50% of Pull at Reduced Engine Speed—Two Hours 11th (C3) Gear											
67.16 *(50.08)*	4682 *(20.83)*	5.38 *(8.66)*	1388	2.58	4.620 *(17.490)*	0.482 *(0.293)*	14.54 *(2.863)*	179 *(81.4)*	36 *(2.2)*	39 *(3.6)*	28.550 *(96.409)*
MAXIMUM POWER IN SELECTED GEARS											
111.39 *(83.07)*	15069 *(67.03)*	2.77 *(4.46)*	2225	14.74	3rd (A3) Gear			196 *(91.1)*	43 *(6.1)*	50 *(10.0)*	28.830 *(97.355)*
121.23 *(90.40)*	12134 *(53.97)*	3.75 *(6.03)*	2202	7.64	4th (A4) Gear			198 *(92.2)*	43 *(6.1)*	52 *(11.1)*	28.820 *(97.321)*
124.00 *(92.47)*	11152 *(49.60)*	4.17 *(6.71)*	2202	6.64	5th (B1) Gear			201 *(93.9)*	44 *(6.7)*	53 *(11.7)*	28.820 *(97.321)*
125.18 *(93.35)*	9363 *(41.65)*	5.01 *(8.07)*	2200	5.25	6th (C1) Gear			203 *(94.7)*	45 *(7.2)*	54 *(12.2)*	28.810 *(97.287)*
123.61 *(92.18)*	8624 *(38.36)*	5.38 *(8.65)*	2200	4.95	7th (B2) Gear			202 *(94.4)*	45 *(7.2)*	54 *(12.2)*	28.800 *(97.253)*
123.36 *(91.99)*	7201 *(32.03)*	6.42 *(10.34)*	2199	3.97	8th (C2) Gear			202 *(94.2)*	45 *(7.2)*	55 *(12.8)*	28.790 *(97.220)*
124.38 *(92.75)*	6549 *(29.13)*	7.12 *(11.46)*	2201	3.59	9th (B3) Gear			202 *(94.2)*	45 *(7.2)*	55 *(12.8)*	28.780 *(97.186)*
122.93 *(91.67)*	5863 *(26.08)*	7.86 *(12.65)*	2201	3.12	10th (D1) Gear			200 *(93.3)*	46 *(7.8)*	55 *(12.8)*	28.770 *(97.152)*
123.35 *(91.98)*	5458 *(24.28)*	8.48 *(13.64)*	2200	2.37	11th (C3) Gear			202 *(94.2)*	46 *(7.8)*	55 *(12.8)*	28.760 *(97.118)*

Department of Agricultural Engineering

Dates of Test: April 4-25, 1983

Manufacturer: JOHN DEERE TRACTOR WORKS, P.O. Box 270, Waterloo, Iowa 50702

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8416 **Fuel weight** 7.007 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 3.988 gal *(15.097 l)* **Drained from motor** 3.670 gal *(13 894 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 45.5 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6466T242728* **Crankshaft** lengthwise **Rated rpm** 2000 to 2200 **Bore and stroke** 4.57" x 4.75" *(116.0 mm x 120.6 mm)* **Compression ratio** 15.8 to 1 **Displacement** 466 cu in *(7636 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements and prestrainer **Muffler** vertical **Cooling medium temperature control** two thermostats and variable speed fan.

CHASSIS: Type standard with duals **Serial No.** *RW4450H004234* **Tread width** rear 60.0" *(1524 mm)* to 130" *(3300 mm)* front 58" *(1470 mm)* to 82.6" *(2099 mm)* **Wheel base** 106.7" *(2710 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 28.0" *(711 mm)* Vertical distance above roadway 41.9" *(1064 mm)* Horizontal distance from center of rear wheel tread 0.5" *(13 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph *(km/h)*** first 2.0 *(3.2)* second 2.5 *(4.0)* third 3.3 *(5.3)* fourth 4.1 *(6.7)* fifth 4.6 *(7.3)* sixth 5.4 *(8.7)* seventh 5.8 *(9.3)* eighth 6.8 *(11.0)* ninth 7.5 *(12.1)* tenth 8.3 *(13.4)* eleventh 8.9 *(14.4)* twelfth 9.5 *(15.3)* thirteenth 10.5 *(16.9)* fourteenth 11.3 *(18.2)* fifteenth 13.7 *(22.1)* sixteenth 17.3 *(27.9)* reverse 3.2 *(5.1)*, 4.0 *(6.5)*, 7.3 *(11.8)*, 8.7 *(13.9)*, 9.2 *(14.8)*, 10.9 *(17.6)* **Clutch** wet multiple disc hydraulically power actuated and operated by foot pedal **Brakes** wet disc hydraulically power actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 146" *(3.7 m)* left 146" *(3.7 m)* (on concrete surface without brake) right 157" *(4.0 m)* left 157" *(4.0 m)* **Turning space diameter** (on concrete surface with brake applied) right 302" *(7.67 m)* left 302" *(7.67 m)* (on concrete surface without brake) right 338" *(8.58 m)* left 338" *(8.58 m)* **Power take-off** 540 rpm at 2201 engine rpm and 1002 rpm at 2200 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 117°F *(47.2°C)*. Nine gears were chosen between 15% slip (bias ply tires), front end stability limit (radial ply tires) and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1476.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

LUGGING ABILITY IN 6th (C1) GEAR

Crankshaft Speed rpm	2200	1984	1763	1538	1323	1098
Pull—lbs *(kN)*	9363 *(41.65)*	10696 *(47.58)*	11602 *(51.61)*	12045 *(53.58)*	11922 *(53.03)*	10948 *(48.70)*
Increase in Pull %	0	14	24	29	27	17
Power—Hp *(kW)*	125.18 *(93.35)*	127.53 *(95.10)*	122.05 *(91.02)*	110.03 *(82.05)*	93.85 *(69.99)*	72.06 *(53.74)*
Speed—Mph *(km/h)*	5.01 *(8.07)*	4.47 *(7.20)*	3.95 *(6.35)*	3.43 *(5.51)*	2.95 *(4.75)*	2.47 *(3.97)*
Slip %	5.25	6.28	7.14	7.57	7.28	6.57

TRACTOR SOUND LEVEL WITH CAB	Radial Ply 2000 RPM dB(A)	Radial Ply 2200 RPM dB(A)	Bias Ply 2200 RPM dB(A)
Maximum Available Power—Two Hours	73.0	74.0	73.5
75% of Pull at Maximum Power—Ten Hours			73.5
50% of Pull at Maximum Power—Two Hours			75.0
50% of Pull at Reduced Engine Speed—Two Hours			71.5
Bystander in 16th (D4) gear			86.5

SUPPLEMENTARY TESTS
DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES. POWER AND FUEL CONSUMPTION AT 2200 RPM

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 6th (C1) Gear											
124.15 *(92.58)*	8660 *(38.52)*	5.38 *(8.65)*	2199	3.20	8.456 *(32.009)*	0.477 *(0.290)*	14.68 *(2.892)*	204 *(95.6)*	48 *(8.9)*	60 *(15.6)*	28.945 *(97.743)*
MAXIMUM POWER IN SELECTED GEARS											
99.94 *(74.53)*	16278 *(72.41)*	2.30 *(3.71)*	2249	12.52	2nd (A2) Gear			192 *(88.9)*	44 *(6.7)*	51 *(10.6)*	28.940 *(97.726)*
126.34 *(94.21)*	8823 *(39.25)*	5.37 *(8.64)*	2201	3.28	6th (C1) Gear			201 *(93.9)*	46 *(7.8)*	55 *(12.8)*	28.960 *(97.794)*

POWER AND FUEL CONSUMPTION AT 2000 RPM
POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—911 rpm)								
142.27 *(106.09)*	2000	8.327 *(31.521)*	0.410 *(0.250)*	17.08 *(3.366)*	201 *(93.7)*	68 *(19.8)*	75 *(23.7)*	28.925 *(97.675)*

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 6th (C1) Gear											
127.24 *(94.88)*	9822 *(43.69)*	4.86 *(7.82)*	1999	3.80	8.349 *(31.604)*	0.460 *(0.280)*	15.24 *(3.002)*	206 *(96.4)*	48 *(8.9)*	63 *(16.9)*	28.920 *(97.659)*
MAXIMUM POWER IN SELECTED GEAR											
128.68 *(95.95)*	9930 *(44.17)*	4.86 *(7.82)*	2000	3.68	6th (C1) Gear			201 *(93.9)*	47 *(8.3)*	57 *(13.9)*	28.960 *(97.794)*

John Deere 4450 Quadrange Diesel

TIRES, BALLAST AND WEIGHT		Bias Ply Tires With Ballast	Bias Ply Tires Without Ballast	Radial Ply Tires With Ballast	Radial Ply Tires Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 18.4-38; 6, 14 *(95)*	Four 18.4-38; 6, 14 *(95)*	Inner Two 18.4R38; 8; 12 *(85)* Outer Two 18.4R38; 6; 12 *(85)*	Inner Two 18.4R38; 8; 12 *(85)* Outer Two 18.4R38; 6; 12 *(85)*
Ballast	—Liquid (each inner)	1140 lb *(517 kg)*	None	953 lb *(432 kg)*	None
	—Cast Iron (each)	None	None	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 11.00-16; 8; 40 *(275)*	Two 11.00-16; 8; 40 *(275)*	Two 11.00-16; 8; 40 *(275)*	Two 11.00-16; 8; 40 *(275)*
Ballast	—Liquid (each)	None	None	None	None
	—Cast Iron (each)	50 lb *(23 kg)*	None	50 lb *(23 kg)*	None
Height of Drawbar		21.5 in *(545 mm)*	21.5 in *(545 mm)*	20 in *(510 mm)*	20 in *(510 mm)*
Static Weight with Operator	—Rear	12880 lb *(5842 kg)*	10600 lb *(4808 kg)*	12945 lb *(5872 kg)*	11040 lb *(5008 kg)*
	—Front	3800 lb *(1724 kg)*	3700 lb *(1678 kg)*	3815 lb *(1730 kg)*	3715 lb *(1685 kg)*
	—Total	16680 lb *(7566 kg)*	14300 lb *(6486 kg)*	16760 lb *(7602 kg)*	14755 lb *(6693 kg)*

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1477
JOHN DEERE 4650 QUADRANGE DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—998 rpm)								
165.70 (123.56)	2200	9.750 (36.908)	0.412 (0.251)	16.99 (3.348)	188 (86.9)	63 (17.3)	75 (24.0)	28.905 (97.602)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
143.45 (106.97)	2240	8.825 (33.399)	0.431 (0.262)	16.26 (3.203)	184 (84.2)	64 (18.1)	76 (24.4)	....
0.00 (0.00)	2331	2.509 (9.498)	....	....	172 (77.5)	63 (17.2)	74 (23.1)	....
73.12 (54.53)	2287	5.638 (21.342)	0.540 (0.329)	12.97 (2.555)	180 (82.5)	64 (17.8)	76 (24.4)	....
164.75 (122.85)	2200	9.722 (36.802)	0.414 (0.252)	16.95 (3.338)	190 (87.8)	66 (18.6)	76 (24.7)	....
36.96 (27.56)	2312	4.041 (15.297)	0.766 (0.466)	9.15 (1.802)	174 (78.9)	66 (18.9)	78 (25.6)	....
108.52 (80.92)	2262	7.162 (27.111)	0.465 (0.281)	15.15 (2.985)	182 (83.6)	66 (18.6)	78 (25.3)	....
Av 87.80 Av (65.47)	2272	6.316 (23.909)	0.504 (0.307)	13.90 (2.738)	180 (82.4)	65 (18.2)	76 (24.6)	28.893 (97.564)

DRAWBAR PERFORMANCE WITH BIAS PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (B2) Gear											
142.31 (106.12)	9807 (43.62)	5.44 (8.76)	2200	5.00	9.614 (36.393)	0.473 (0.288)	14.80 (2.916)	190 (87.8)	53 (11.4)	60 (15.6)	28.750 (97.084)
75% of Pull at Maximum Power—Ten Hours 7th (B2) Gear											
113.49 (84.63)	7495 (33.34)	5.68 (9.14)	2261	3.55	8.219 (31.113)	0.508 (0.309)	13.81 (2.720)	187 (86.1)	54 (11.9)	60 (15.5)	28.735 (97.203)
50% of Pull at Maximum Power—Two Hours 7th (B2) Gear											
77.34 (57.68)	4997 (22.23)	5.80 (9.34)	2285	2.43	6.386 (24.172)	0.579 (0.352)	12.11 (2.386)	182 (83.1)	52 (10.8)	56 (13.3)	28.755 (97.101)
50% of Pull at Reduced Engine Speed—Two Hours 11th (C3) Gear											
77.36 (57.69)	4997 (22.23)	5.81 (9.34)	1567	2.39	5.244 (19.851)	0.475 (0.289)	14.75 (2.906)	185 (84.7)	51 (10.3)	54 (12.2)	28.755 (97.101)
MAXIMUM POWER IN SELECTED GEARS											
100.48 (74.92)	16814 (74.79)	2.24 (3.61)	2262	14.92		2nd (A2) Gear		165 (84.7)	46 (8.9)	52 (11.1)	28.790 (97.220)
135.22 (100.84)	15548 (69.16)	3.26 (5.25)	2202	10.57		3rd (A3) Gear		189 (87.2)	48 (8.9)	53 (11.7)	28.790 (97.220)
140.97 (105.12)	12591 (56.01)	4.20 (6.76)	2201	6.91		4th (B1) Gear		190 (87.5)	49 (9.4)	54 (12.2)	28.800 (97.253)
142.42 (106.20)	12365 (55.00)	4.32 (6.95)	2200	6.75		5th (A4) Gear		190 (87.8)	49 (9.4)	55 (12.8)	28.800 (97.253)
142.31 (106.12)	10662 (47.42)	5.01 (8.06)	2200	5.51		6th (C1) Gear		190 (87.8)	50 (10.0)	56 (13.3)	28.810 (97.287)
144.92 (108.07)	9993 (44.45)	5.44 (8.75)	2201	4.96		7th (B2) Gear		190 (87.5)	50 (10.0)	57 (13.9)	28.800 (97.253)
145.38 (108.56)	8464 (37.65)	6.45 (10.38)	2202	4.08		8th (C2) Gear		190 (87.8)	51 (10.6)	57 (13.9)	28.790 (97.220)
142.54 (106.29)	6780 (30.16)	7.88 (12.69)	2201	3.18		9th (B3) Gear		190 (87.5)	52 (11.1)	58 (14.4)	28.780 (97.186)
140.85 (105.03)	6346 (28.23)	8.32 (13.40)	2201	3.10		10th (D1) Gear		190 (87.8)	52 (11.1)	59 (15.0)	28.770 (97.152)

Department of Agricultural Engineering

Dates of Test: April 7-26, 1983

Manufacturer: JOHN DEERE TRACTOR WORKS, P.O. Box 270, Waterloo, Iowa 50702

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8417 **Fuel weight** 7.008 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 4.761 gal *(18.022 l)* **Drained from motor** 4.577 gal *(17.324 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic fluid **Total time engine was operated** 43.0 hours.

ENGINE: **Make** John Deere Diesel **Type** six cylinder vertical with turbocharger and intercooler **Serial No.** *RG6466A242531* **Crankshaft** lengthwise **Rated rpm** 2000 to 2200 **Bore and stroke** 4.57" × 4.75" *(116.0 mm × 120.6 mm)* **Compression ratio** 15.8 to 1 **Displacement** 466 cu in *(7636 ml)* **Starting system** 12 volt **Lubrication pressure** **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements and prestrainer **Muffler** vertical **Cooling medium temperature control** three thermostats and variable speed fan.

CHASSIS: **Type** standard with duals **Serial No.** *RW4650H002529* **Tread width** rear 63" *(1600 mm)* to 130" *(3300 mm)* front 60.2" *(1530 mm)* to 86.3" *(2192 mm)* **Wheel base** 118.5" *(3010 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 31.5" *(800 mm)* Vertical distance above roadway 45.3" *(1151 mm)* Horizontal distance from center of rear wheel tread 0.3" *(8 mm)* to the right **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (2) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 2.0 *(3.2)* second 2.6 *(4.1)* third 3.7 *(5.9)* fourth 4.5 *(7.2)* fifth 4.6 *(7.4)* sixth 5.3 *(8.5)* seventh 5.7 *(9.2)* eighth 6.7 *(10.8)* ninth 8.2 *(13.1)* tenth 8.6 *(13.8)* eleventh 9.6 *(15.4)* twelfth 10.4 *(16.7)* thirteenth 10.9 *(17.5)* fourteenth 12.2 *(19.6)* fifteenth 15.5 *(25.0)* sixteenth 19.7 *(31.7)* reverse 3.8 *(6.1)*, 4.8 *(7.8)*, 8.5 *(13.7)*, 10.0 *(16.1)* 10.8 *(17.4)* 12.7 *(20.4)* **Clutch** wet multiple disc hydraulically power actuated and operated by foot pedal **Brakes** wet disc hydraulically power actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 165" *(4.2 m)* left 165" *(4.2 m)* (on concrete surface without brake) right 181" *(4.6 m)* left 181" *(4.6 m)* **Turning space diameter** (on concrete surface with brake applied) right 346" *(8.79 m)* left 346" *(8.79 m)* (on concrete surface without brake) right 380" *(9.65 m)* left 380" *(9.65 m)* **Power take-off** 998 rpm at 2200 engine rpm.

REPAIRS and ADJUSTMENTS: During preliminary PTO tests, it was determined that there was a misaligned gasket on the intake manifold. This gasket was replaced and test continued.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 127°F *(52.8°C)*. Nine gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1477.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

John Deere 4650 Quadrange Diesel

LUGGING ABILITY IN 7th (B2) GEAR

Crankshaft Speed rpm	2201	1980	1761	1540	1320	1090
Pull—lbs (kN)	9993 (44.45)	11346 (50.47)	12282 (54.63)	13091 (58.23)	13200 (58.72)	11542 (51.34)
Increase in Pull %	0	14	23	31	32	16
Power—Hp (kW)	144.92 (108.07)	146.68 (109.38)	140.21 (104.56)	129.78 (96.77)	112.14 (83.62)	81.91 (61.08)
Speed—Mph (km/h)	5.44 (8.75)	4.85 (7.80)	4.28 (6.89)	3.72 (5.98)	3.19 (5.13)	2.66 (4.28)
Slip %	4.96	5.90	6.08	7.13	7.13	6.21

TRACTOR SOUND LEVEL WITH CAB	Radial Ply 2000 RPM dB(A)	Radial Ply 2200 RPM dB(A)	Bias Ply 2200 RPM dB(A)
Maximum Available Power—Two Hours	73.0	74.0	75.0
75% of Pull at Maximum Power—Ten Hours			73.5
50% of Pull at Maximum Power—Two Hours			73.5
50% of Pull at Reduced Engine Speed—Two Hours			72.0
Bystander in 16th (D4) gear			87.5

SUPPLEMENTARY TESTS
DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES
POWER AND FUEL CONSUMPTION AT 2200 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (B2) Gear											
143.28 (106.85)	9371 (41.68)	5.73 (9.23)	2201	2.09	9.596 (36.325)	0.469 (0.285)	14.93 (2.941)	190 (87.8)	52 (10.8)	67 (19.2)	28.620 (96.645)
MAXIMUM POWER IN SELECTED GEARS											
117.15 (87.36)	18931 (84.21)	2.32 (3.73)	2246	13.21		2nd (A2) Gear		187 (85.8)	47 (8.3)	56 (13.3)	28.680 (96.848)
147.71 (110.15)	9673 (43.03)	5.73 (9.22)	2201	2.22		7th (B2) Gear		190 (87.8)	49 (9.4)	59 (15.0)	28.670 (96.814)

POWER AND FUEL CONSUMPTION AT 2000 RPM
POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—One Hour (PTO Speed—908 rpm)								
167.22 (124.70)	2000	9.374 (35.484)	0.393 (0.239)	17.84 (3.514)	187 (85.9)	63 (17.4)	75 (23.9)	28.900 (97.591)

DRAWBAR PERFORMANCE WITH RADIAL PLY TIRES

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (B2) Gear											
148.33 (110.61)	10712 (47.65)	5.19 (8.36)	2001	2.39	9.507 (35.988)	0.449 (0.273)	15.60 (3.074)	193 (89.2)	56 (13.1)	73 (22.8)	28.535 (96.358)
MAXIMUM POWER IN SELECTED GEAR											
150.79 (112.44)	10906 (48.51)	5.18 (8.34)	1999	2.48		7th (B2) Gear		192 (88.6)	50 (10.0)	62 (16.7)	28.650 (96.747)

TIRES, BALLAST AND WEIGHT		Bias Ply Tires With Ballast	Bias Ply Tires Without Ballast	Radial Ply Tires With Ballast	Radial Ply Tires Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 20.8-38; 10; 14 *(95)*	Four 20.8-38; 10; 14 *(95)*	Four 20.8R38; 10; 12 *(83)*	Four 20.8R38; 10; 12 *(83)*
Ballast	—Liquid (each inner)	752 lb *(341 kg)*	None	520 lb *(236 kg)*	None
	—Cast Iron (each)	None	None	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 14L-16.1; 10; 44 *(305)*	Two 14L-16.1; 10; 44 *(305)*	Two 14L-16.1; 10; 44 *(305)*	Two 14L-16.1; 10; 44 *(305)*
Ballast	—Liquid (each)	None	None	None	None
	—Cast Iron (each)	55 lb *(25 kg)*	None	55 lb *(25 kg)*	None
Height of Drawbar		24.5 in *(620 mm)*	24.5 in *(620 mm)*	24 in *(610 mm)*	24 in *(610 mm)*
Static Weight with Operator	—Rear	14705 lb *(6670 kg)*	13200 lb *(5988 kg)*	14680 lb *(6659 kg)*	13640 lb *(6187 kg)*
	—Front	4910 lb *(2227 kg)*	4800 lb *(2177 kg)*	4910 lb *(2227 kg)*	4800 lb *(2177 kg)*
	—Total	19615 lb *(8897 kg)*	18000 lb *(8165 kg)*	19590 lb *(8886 kg)*	18440 lb *(8364 kg)*

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1478—MASSEY FERGUSON 254 DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—625 rpm)								
43.36 *(32.33)*	2250	2.721 *(10.300)*	0.440 *(0.268)*	15.93 *(3.139)*	183 *(84.1)*	56 *(13.6)*	75 *(23.9)*	29.013 *(97.974)*
Standard Power Take-off Speed (540 rpm)—One Hour								
40.71 *(30.36)*	1944	2.456 *(9.297)*	0.423 *(0.257)*	16.58 *(3.266)*	184 *(84.2)*	56 *(13.3)*	75 *(23.8)*	28.990 *(97.895)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
37.80 *(28.19)*	2307	2.367 *(8.960)*	0.439 *(0.267)*	15.97 *(3.146)*	181 *(82.8)*	54 *(12.2)*	74 *(23.6)*	....
0.00 *(0.00)*	2380	0.762 *(2.884)*	....	....	178 *(80.8)*	56 *(13.6)*	75 *(23.9)*	....
19.22 *(14.33)*	2345	1.464 *(5.542)*	0.534 *(0.325)*	13.13 *(2.586)*	178 *(81.4)*	55 *(12.8)*	75 *(23.9)*	....
43.31 *(32.30)*	2250	2.740 *(10.372)*	0.443 *(0.270)*	15.81 *(3.114)*	184 *(84.2)*	56 *(13.3)*	76 *(24.4)*	....
9.70 *(7.23)*	2370	1.100 *(4.164)*	0.795 *(0.484)*	8.82 *(1.736)*	178 *(80.8)*	56 *(13.1)*	74 *(23.6)*	....
28.55 *(21.29)*	2324	1.884 *(7.132)*	0.462 *(0.281)*	15.16 *(2.985)*	179 *(81.7)*	55 *(12.8)*	74 *(23.6)*	....
Av 23.10 ***Av* *(17.23)***	**2329**	**1.719** ***(6.507)***	**0.522** ***(0.317)***	**13.43** ***(2.648)***	**180** ***(81.9)***	**55** ***(12.9)***	**75** ***(23.8)***	**28.950** ***(97.760)***

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th Gear											
33.43 *(24.93)*	2160 *(9.61)*	5.80 *(9.34)*	2250	7.18	2.604 *(9.858)*	0.546 *(0.332)*	12.84 *(2.529)*	184 *(84.4)*	54 *(12.2)*	58 *(14.4)*	28.835 *(97.371)*
75% of Pull at Maximum Power—Ten Hours 8th Gear											
27.49 *(20.50)*	1700 *(7.56)*	6.07 *(9.76)*	2303	5.28	2.197 *(8.318)*	0.560 *(0.341)*	12.51 *(2.465)*	184 *(84.3)*	55 *(12.6)*	59 *(15.2)*	28.965 *(97.810)*
50% of Pull at Maximum Power—Two Hours 8th Gear											
18.93 *(14.12)*	1133 *(5.04)*	6.27 *(10.09)*	2332	3.39	1.784 *(6.752)*	0.660 *(0.402)*	10.62 *(2.091)*	184 *(84.2)*	51 *(10.6)*	53 *(11.7)*	28.820 *(97.321)*
50% of Pull at Reduced Engine Speed—Two Hours 10th Gear											
18.94 *(14.12)*	1133 *(5.04)*	6.27 *(10.09)*	1491	3.18	1.391 *(5.267)*	0.515 *(0.313)*	13.61 *(2.681)*	183 *(83.6)*	58 *(14.2)*	62 *(16.4)*	28.790 *(97.220)*
MAXIMUM POWER IN SELECTED GEARS											
27.57 *(20.56)*	3844 *(17.10)*	2.60 *(4.33)*	2303	14.80	5th Gear			184 *(84.2)*	58 *(14.4)*	65 *(18.3)*	28.760 *(97.118)*
33.41 *(24.92)*	3650 *(16.23)*	3.43 *(5.53)*	2251	13.52	6th Gear			185 *(85.0)*	53 *(11.7)*	56 *(13.3)*	28.830 *(97.355)*
34.18 *(25.49)*	2767 *(12.31)*	4.63 *(7.46)*	2250	9.52	7th Gear			185 *(84.7)*	52 *(11.1)*	55 *(12.8)*	28.780 *(97.186)*
35.14 *(26.20)*	2266 *(10.08)*	5.82 *(9.36)*	2251	7.15	8th Gear			185 *(84.7)*	52 *(11.1)*	55 *(12.8)*	28.780 *(97.186)*
32.85 *(24.49)*	1731 *(7.70)*	7.12 *(11.45)*	2249	5.58	9th Gear			185 *(84.7)*	53 *(11.7)*	56 *(13.3)*	28.830 *(97.355)*
32.75 *(24.42)*	1312 *(5.83)*	9.37 *(15.07)*	2249	4.13	10th Gear			185 *(85.0)*	53 *(11.7)*	56 *(13.3)*	28.830 *(97.355)*

Department of Agricultural Engineering

Dates of Test: May 11-23, 1983

Manufacturer: MASSEY FERGUSON S.p.A Landini Division, Via Matteotti 17, 42042 Fabbrico (RE) Italy

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8417 **Fuel weight** 7.008 lbs/gal *(0.840 kg/l)* **Oil SAE** 20-20W **API service classification** SE, SF, CC **To motor** 1.869 gal *(7.076 l)* **Drained from motor** 1.351 gal *(5.115 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran oil **Total time engine was operated** 42.5 hours.

ENGINE: Make Perkins Diesel **Type** three cylinder vertical **Serial No.** CE21899U703041J **Crankshaft** lengthwise **Rated rpm** 2250 **Bore and stroke** 3.6" × 5.0" *(91.4 mm × 127.0 mm)* **Compression ratio** 16.5 to 1 **Displacement** 153 cu in *(2502 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** oil bath with centrifugal precleaner **Oil filter** one full flow paper cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type front wheel assist **Serial No.** *2229794* **Tread width** rear 59.1" *(1500 mm)* to 74.8" *(1900 mm)* front 59.0" *(1500 mm)* **Wheel base** 81.1" *(2060 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 33.9" *(860 mm)* Vertical distance above roadway 30.6" *(778 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 1.0 *(1.6)* second 1.6 *(2.6)* third 2.1 *(3.3)* fourth 2.5 *(4.0)* fifth 3.0 *(4.8)* sixth 3.9 *(6.3)* seventh 5.0 *(8.0)* eighth 6.1 *(9.8)* ninth 7.4 *(11.9)* tenth 9.6 *(15.4)* eleventh 12.4 *(19.9)* twelfth 18.2 *(29.3)* reverse 2.7 *(4.3)*, 4.2 *(6.7)*, 5.3 *(8.6)*, 7.9 *(12.7)* **Clutch** dry disc operated by foot pedal **Brakes** dry disc operated by two foot pedals which can be locked together and hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 144" *(3.66 m)* left 156" *(3.96 m)* (on concrete surface without brake) right 168" *(4.27 m)* left 186" *(4.72 m)* **Turning space diameter** (on concrete surface with brake applied) right 302" *(7.67 m)* left 327" *(8.31 m)* (on concrete surface without brake) right 351" *(8.92 m)* left 387" *(9.83 m)* **Power take-off** 540 rpm at 1944 engine rpm.

LUGGING ABILITY IN 8th GEAR

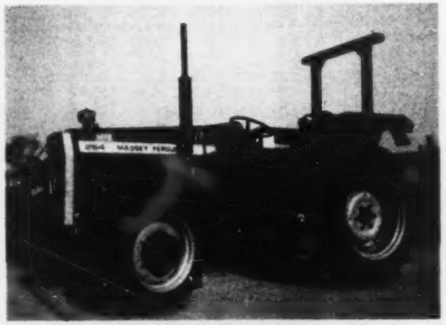
Crankshaft Speed rpm	2251	2027	1807	1578	1347	1116
Pull—lbs *(kN)*	2266 *(10.08)*	2472 *(11.00)*	2608 *(11.60)*	2733 *(12.16)*	2801 *(12.46)*	2735 *(12.17)*
Increase in Pull %	0	9	15	21	24	21
Power—Hp *(kW)*	35.14 *(26.20)*	34.22 *(25.52)*	31.88 *(23.78)*	29.12 *(21.71)*	25.43 *(18.96)*	20.64 *(15.39)*
Speed—Mph *(km/h)*	5.82 *(9.36)*	5.19 *(8.36)*	4.58 *(7.38)*	4.00 *(6.43)*	3.40 *(5.48)*	2.83 *(4.55)*
Slip %	7.15	7.86	8.73	8.94	9.15	8.73

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	99.0	98.0
75% of Pull at Maximum Power—Ten Hours		98.0
50% of Pull at Maximum Power—Two Hours		97.0
50% of Pull at Reduced Engine Speed—Two Hours		94.5
Bystander in 11th gear		86.0

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th Gear											
33.97 *(25.33)*	2139 *(9.51)*	5.96 *(9.59)*	2250	4.60	2.568 *(9.723)*	0.530 *(0.322)*	13.23 *(2.606)*	184 *(84.4)*	53 *(11.7)*	62 *(16.4)*	28.850 *(97.422)*
MAXIMUM POWER IN SELECTED GEARS											
30.94 *(23.07)*	5279 *(23.48)*	2.20 *(3.54)*	2289	14.85	4th Gear			184 *(84.4)*	58 *(14.4)*	64 *(17.8)*	28.760 *(97.118)*
35.86 *(26.74)*	2261 *(10.06)*	5.95 *(9.57)*	2250	4.74	8th Gear			184 *(84.4)*	52 *(11.1)*	55 *(12.8)*	28.780 *(97.186)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 13.6-28; 6; 20 *(140)*	Two 13.6-28; 6; 20 *(140)*
Ballast	—Liquid (each)	545 lb *(247 kg)*	None
	—Cast Iron (each)	98 lb *(44 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 9.5-20; 8; 20 *(140)*	Two 9.5-20; 8; 20 *(140)*
Ballast	—Liquid (each)	200 lb *(91 kg)*	None
	—Cast Iron (each)	53 lb *(24 kg)*	None
Height of Drawbar		15.5 in *(395 mm)*	15.5 in *(395 mm)*
Static Weight with Operator	—Rear	4515 lb *(2048 kg)*	3230 lb *(1465 kg)*
	—Front	2760 lb *(1252 kg)*	2255 lb *(1023 kg)*
	—Total	7275 lb *(3300 kg)*	5485 lb *(2488 kg)*



Massey Ferguson 254 Diesel

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 146°F *(63.3°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1478.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1479—MASSEY FERGUSON 274 DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—611 rpm)								
55.30 *(41.30)*	2200	3.411 *(12.912)*	0.432 *(0.263)*	16.24 *(3.199)*	186 *(85.6)*	57 *(13.7)*	75 *(24.0)*	28.910 *(97.625)*
Standard Power Take-off Speed (540 rpm)—One Hour								
54.26 *(40.46)*	1944	3.146 *(11.909)*	0.406 *(0.247)*	17.25 *(3.397)*	187 *(86.1)*	56 *(13.1)*	75 *(23.7)*	28.890 *(97.557)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
48.92 *(36.48)*	2286	3.159 *(11.958)*	0.453 *(0.275)*	15.48 *(3.051)*	183 *(83.9)*	56 *(13.6)*	76 *(24.7)*	…… ……
0.00 *(0.00)*	2389	1.164 *(4.406)*	…… ……	…… ……	150 *(65.6)*	58 *(14.7)*	75 *(23.9)*	…… ……
25.04 *(18.67)*	2342	2.080 *(7.874)*	0.582 *(0.354)*	12.04 *(2.371)*	165 *(73.9)*	56 *(13.6)*	77 *(25.0)*	…… ……
55.64 *(41.49)*	2200	3.412 *(12.916)*	0.430 *(0.261)*	16.31 *(3.212)*	187 *(86.1)*	58 *(14.2)*	76 *(24.7)*	…… ……
12.66 *(9.44)*	2364	1.622 *(6.140)*	0.898 *(0.546)*	7.80 *(1.537)*	154 *(67.5)*	56 *(13.3)*	73 *(22.8)*	…… ……
37.14 *(27.70)*	2315	2.581 *(9.770)*	0.487 *(0.296)*	14.39 *(2.835)*	170 *(76.4)*	57 *(13.9)*	74 *(23.3)*	…… ……
Av 29.90 *Av* *(22.30)*	2316	2.337 *(8.847)*	0.548 *(0.333)*	12.80 *(2.521)*	168 *(75.6)*	57 *(13.9)*	75 *(24.1)*	28.873 *(97.501)*

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th Gear											
46.13 *(34.40)*	2637 *(11.73)*	6.56 *(10.56)*	2200	7.05	3.353 *(12.694)*	0.509 *(0.310)*	13.70 *(2.710)*	189 *(86.9)*	56 *(13.1)*	72 *(21.9)*	28.975 *(97.844)*
75% of Pull at Maximum Power—Ten Hours 8th Gear											
37.31 *(27.83)*	2006 *(8.92)*	6.98 *(11.23)*	2292	5.09	2.947 *(11.154)*	0.553 *(0.337)*	12.66 *(2.495)*	185 *(84.9)*	65 *(18.3)*	78 *(25.5)*	28.802 *(97.260)*
50% of Pull at Maximum Power—Two Hours 8th Gear											
25.51 *(19.02)*	1337 *(5.95)*	7.15 *(11.51)*	2309	3.37	2.408 *(9.115)*	0.662 *(0.402)*	10.59 *(2.087)*	162 *(71.9)*	49 *(9.2)*	59 *(15.0)*	29.040 *(98.064)*
50% of Pull at Reduced Engine Speed—Two Hours 10th Gear											
25.56 *(19.06)*	1337 *(5.95)*	7.17 *(11.54)*	1479	3.20	1.784 *(6.752)*	0.489 *(0.297)*	14.35 *(2.823)*	164 *(73.3)*	53 *(11.4)*	65 *(18.3)*	29.025 *(98.013)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %				Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
38.60 *(28.78)*	4719 *(20.99)*	3.07 *(4.94)*	2280	14.90		5th Gear		165 *(73.6)*	46 *(7.8)*	55 *(12.8)*	29.040 *(98.064)*
44.02 *(32.83)*	4271 *(19.00)*	3.87 *(6.22)*	2200	13.54		6th Gear		186 *(85.6)*	52 *(11.1)*	66 *(18.9)*	29.000 *(97.929)*
45.61 *(34.01)*	3246 *(14.44)*	5.27 *(8.48)*	2198	8.59		7th Gear		185 *(84.7)*	53 *(11.7)*	64 *(17.8)*	28.990 *(97.895)*
46.76 *(34.87)*	2674 *(11.89)*	6.56 *(10.56)*	2198	7.02		8th Gear		188 *(86.4)*	56 *(13.3)*	72 *(22.2)*	28.970 *(97.827)*
44.79 *(33.40)*	2088 *(9.29)*	8.05 *(12.95)*	2201	5.40		9th Gear		187 *(85.8)*	54 *(12.2)*	68 *(20.0)*	29.000 *(97.929)*

Department of Agricultural Engineering

Dates of Test: May 12-26, 1983

Manufacturer: MASSEY FERGUSON S.p.A Landini Division, Via Matteotti 17, 42042 Fabbrico (RE) Italy

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8417 **Fuel weight** 7.008 lbs/gal *(0.840 kg/l)* **Oil SAE** 20-20W **API service classification** SE, SF, CC **To motor** 1.986 gal *(7.518 l)* **Drained from motor** 1.764 gal *(6.676 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran oil **Total time engine was operated** 44.5 hours.

ENGINE: Make Perkins Diesel **Type** four cylinder vertical **Serial No.** LD22573U840084J **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 3.875" × 5" *(98.4 mm × 127 mm)* **Compression ratio** 16 to 1 **Displacement** 236 cu in *(3865 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** oil bath with centrifugal precleaner **Oil filter** one full flow paper cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type front wheel assist **Serial No.** *22111958* **Tread width** rear 59.1" *(1500 mm)* to 75" *(1905 mm)* front 59.5" *(1511 mm)* **Wheel base** 87.5" *(2222 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 36.5" *(928 mm)* Vertical distance above roadway 36.1" *(918 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 1.1 *(1.8)* second 1.8 *(2.9)* third 2.3 *(3.7)* fourth 2.8 *(4.5)* fifth 3.4 *(5.4)* sixth 4.3 *(7.0)* seventh 5.6 *(9.0)* eighth 6.8 *(11.0)* ninth 8.3 *(13.3)* tenth 10.7 *(17.2)* eleventh 13.8 *(22.2)* twelfth 20.3 *(32.7)* reverse 3.0 *(4.8)*, 4.6 *(7.4)*, 6.0 *(9.6)*, 8.8 *(14.1)* **Clutch** dry disc operated by foot pedal **Brakes** dry disc operated by two foot pedals which can be locked together and hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 169" *(4.29 m)* left 186" *(4.72 m)* (on concrete surface without brake) right 191" *(4.85 m)* left 207" *(5.26 m)* **Turning space diameter** (on concrete surface with brake applied) right 354" *(8.99 m)* left 388" *(9.85 m)* (on concrete surface without brake) right 398" *(10.11 m)* left 430" *(10.92 m)* **Power take-off** 540 rpm at 1944 engine rpm.

LUGGING ABILITY IN 8th GEAR

Crankshaft Speed rpm	2198	1980	1760	1543	1326	1096	880
Pull—lbs *(kN)*	2674 *(11.89)*	2944 *(13.10)*	3143 *(13.98)*	3255 *(14.48)*	3394 *(15.10)*	3414 *(15.19)*	3276 *(14.57)*
Increase in Pull %	0	10	18	22	27	28	23
Power—Hp *(kW)*	46.76 *(34.87)*	45.99 *(34.29)*	43.25 *(32.25)*	39.04 *(29.12)*	34.79 *(25.95)*	28.96 *(21.60)*	22.40 *(16.71)*
Speed—Mph *(km/h)*	6.56 *(10.56)*	5.86 *(9.43)*	5.16 *(8.30)*	4.50 *(7.24)*	3.84 *(6.19)*	3.18 *(5.12)*	2.56 *(4.13)*
Slip %	7.02	7.78	8.65	9.02	9.62	9.50	9.02

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	99.5	99.5
75% of Pull at Maximum Power—Ten Hours		98.5
50% of Pull at Maximum Power—Two Hours		98.0
50% of Pull at Reduced Engine Speed—Two Hours		95.5
Bystander in 11th gear		87.0

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th Gear											
47.02 *(35.06)*	2610 *(11.61)*	6.76 *(10.87)*	2199	5.57	3.389 *(12.829)*	0.505 *(0.307)*	13.88 *(2.733)*	189 *(87.2)*	58 *(14.4)*	76 *(24.2)*	28.930 *(97.692)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %				Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
42.13 *(31.41)*	6194 *(27.55)*	2.55 *(4.10)*	2269	14.87		4th Gear		168 *(75.3)*	45 *(7.2)*	53 *(11.7)*	29.020 *(97.996)*
47.42 *(35.36)*	2637 *(11.73)*	6.74 *(10.85)*	2198	5.67		8th Gear		185 *(85.0)*	54 *(12.2)*	68 *(20.0)*	29.000 *(97.929)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 16.9-30; 6; 22 *(150)*	Two 16.9-30; 6; 22 *(150)*
Ballast	—Liquid (each)	878 lb *(398 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 11.2-24; 6; 20 *(140)*	Two 11.2-24; 6; 20 *(140)*
Ballast	—Liquid (each)	225 lb *(102 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		17.5 in *(445 mm)*	17.5 in *(445 mm)*
Static Weight with Operator	—Rear	5240 lb *(2377 kg)*	3485 lb *(1581 kg)*
	—Front	2950 lb *(1338 kg)*	2500 lb *(1134 kg)*
	—Total	8190 lb *(3715 kg)*	5985 lb *(2715 kg)*

274 MASSEY FERGUSON

Massey Ferguson 274 Diesel

REPAIRS and ADJUSTMENTS: The tube in the left rear tire was replaced following the break in period.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 158°F *(70.1°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1479.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1480—MASSEY FERGUSON 294 DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—584 rpm)								
67.59 *(50.25)*	2100	3.905 *(14.782)*	0.406 *(0.247)*	17.26 *(3.399)*	190 *(88.0)*	56 *(13.5)*	75 *(23.7)*	28.933 *(97.704)*
Standard Power Take-off Speed (540 rpm)—One Hour								
64.94 *(48.43)*	1944	3.694 *(13.983)*	0.399 *(0.243)*	17.58 *(3.463)*	190 *(87.8)*	59 *(15.0)*	75 *(24.1)*	28.940 *(97.726)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
59.83 *(44.62)*	2192	3.501 *(13.253)*	0.410 *(0.250)*	17.09 *(3.367)*	186 *(85.6)*	59 *(15.0)*	74 *(23.6)*	....
0.00 *(0.00)*	2262	1.055 *(3.986)*	....	....	164 *(73.3)*	58 *(14.2)*	76 *(24.4)*	....
30.39 *(22.66)*	2229	2.174 *(8.229)*	0.501 *(0.305)*	13.98 *(2.754)*	171 *(77.2)*	58 *(14.4)*	74 *(23.6)*	....
67.09 *(50.03)*	2100	3.886 *(14.710)*	0.406 *(0.247)*	17.26 *(3.401)*	189 *(87.2)*	60 *(15.3)*	76 *(24.2)*	....
15.31 *(11.42)*	2244	1.601 *(6.060)*	0.733 *(0.446)*	9.56 *(1.884)*	165 *(73.9)*	60 *(15.3)*	76 *(24.4)*	....
45.21 *(33.71)*	2210	2.778 *(10.516)*	0.431 *(0.262)*	16.28 *(3.206)*	178 *(80.8)*	60 *(15.6)*	75 *(23.9)*	....
Av 36.31 **Av** *(27.08)*	**2206**	**2.496** *(9.448)*	**0.482** *(0.293)*	**14.53** *(2.863)*	**175** *(79.3)*	**59** *(14.9)*	**75** *(24.1)*	**28.935** *(97.709)*

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th Gear											
55.23 *(41.18)*	3594 *(15.98)*	5.76 *(9.28)*	2099	8.76	3.763 *(14.245)*	0.478 *(0.290)*	14.68 *(2.891)*	191 *(88.3)*	53 *(11.4)*	68 *(19.7)*	28.985 *(97.878)*
75% of Pull at Maximum Power—Ten Hours 8th Gear											
44.87 *(33.46)*	2746 *(12.21)*	6.13 *(9.86)*	2196	7.18	3.217 *(12.179)*	0.503 *(0.306)*	13.95 *(2.747)*	177 *(80.3)*	49 *(9.2)*	50 *(10.1)*	28.893 *(97.567)*
50% of Pull at Maximum Power—Two Hours 8th Gear											
30.85 *(23.01)*	1851 *(8.14)*	6.32 *(10.17)*	2211	4.98	2.461 *(9.316)*	0.550 *(0.340)*	12.54 *(2.470)*	174 *(78.6)*	52 *(11.1)*	53 *(11.7)*	28.675 *(96.831)*
50% of Pull at Reduced Engine Speed—Two Hours 10th Gear											
30.89 *(23.03)*	1851 *(8.14)*	6.33 *(10.18)*	1414	4.70	2.104 *(7.966)*	0.478 *(0.290)*	14.68 *(2.891)*	175 *(79.2)*	55 *(12.8)*	57 *(13.6)*	28.625 *(96.662)*
MAXIMUM POWER IN SELECTED GEARS											
51.44 *(38.36)*	5665 *(25.20)*	3.41 *(5.48)*	2101	14.92		6th Gear		181 *(82.8)*	52 *(11.1)*	54 *(12.2)*	28.690 *(96.882)*
53.94 *(40.22)*	4415 *(19.64)*	4.58 *(7.37)*	2100	11.34		7th Gear		191 *(88.1)*	52 *(11.1)*	64 *(17.8)*	29.010 *(97.962)*
56.28 *(41.97)*	3661 *(16.28)*	5.77 *(9.28)*	2100	8.67		8th Gear		191 *(88.1)*	52 *(11.1)*	63 *(17.2)*	29.010 *(97.962)*
54.60 *(40.71)*	2887 *(12.84)*	7.09 *(11.41)*	2100	6.78		9th Gear		190 *(87.8)*	52 *(11.1)*	65 *(18.3)*	29.000 *(97.929)*
54.90 *(40.94)*	2198 *(9.78)*	9.37 *(15.07)*	2101	5.08		10th Gear		191 *(88.1)*	52 *(11.1)*	66 *(18.9)*	29.000 *(97.929)*

Department of Agricultural Engineering

Dates of Test: May 9-20, 1983

Manufacturer: MASSEY FERGUSON S.p.A., Landini Division, Via Matteotti 17, 42042 Fabbrico (RE) Italy

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8418 **Fuel weight** 7.009 lbs/gal *(0.840 kg/l)* **Oil SAE** 20-20W **API service classification** SE, SF, CC **To motor** 1.684 gal *(6.374 l)* **Drained from motor** 1.529 gal *(5.787 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran oil **Total time engine was operated** 44.5 hours.

ENGINE: Make Perkins Diesel **Type** four cylinder vertical **Serial No.** LF22575U845253J **Crankshaft** lengthwise **Rated rpm** 2100 **Bore and stroke** 3.975" × 5" *(101 mm × 127 mm)* **Compression ratio** 16 to 1 **Displacement** 248 cu in *(4067 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** oil bath with centrifugal precleaner **Oil filter** one full flow cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type front wheel assist **Serial No.** *2236220* **Tread width** rear 61" *(1549 mm)* to 81" *(2057 mm)* front 61.5" *(1562 mm)* **Wheel base** 87.25" *(2216 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 34.9" *(886 mm)* Vertical distance above roadway 30.3" *(769 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 1.0 *(1.6)* second 1.6 *(2.6)* third 2.0 *(3.3)* fourth 2.5 *(4.0)* fifth 3.0 *(4.8)* sixth 3.9 *(6.2)* seventh 5.0 *(8.0)* eighth 6.1 *(9.8)* ninth 7.4 *(11.8)* tenth 9.5 *(15.3)* eleventh 12.3 *(19.8)* twelfth 18.1 *(29.1)* reverse 2.7 *(4.3)*, 4.1 *(6.6)*, 5.3 *(8.6)*, 7.8 *(12.6)* **Clutch** dry disc operated by foot pedal **Brakes** dry disc operated by two foot pedals which can be locked together and hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 165.5" *(4.20 m)* left 167.5" *(4.25 m)* (on concrete surface without brake) right 187.5" *(4.76 m)* left 187.5" *(4.76 m)* **Turning space diameter** (on concrete surface with brake applied) right 342" *(8.69 m)* left 346" *(8.79 m)* (on concrete surface without brake) right 386" *(9.80 m)* left 386" *(9.80 m)* **Power take-off** 540 rpm at 1944 engine rpm.

LUGGING ABILITY IN 8th GEAR

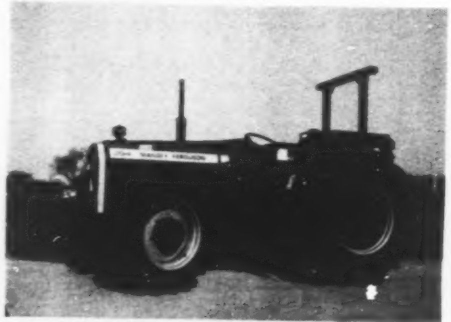
Crankshaft Speed rpm	2100	1888	1683	1468	1255	1054
Pull—lbs *(kN)*	3661 *(16.28)*	3888 *(17.29)*	4120 *(18.33)*	4295 *(19.11)*	4378 *(19.47)*	4325 *(19.24)*
Increase in Pull %	0	6	13	17	20	18
Power—Hp *(kW)*	56.28 *(41.97)*	53.30 *(39.75)*	49.90 *(37.21)*	45.06 *(33.60)*	39.19 *(29.22)*	32.53 *(24.26)*
Speed—Mph *(km/h)*	5.77 *(9.28)*	5.14 *(8.27)*	4.54 *(7.31)*	3.93 *(6.33)*	3.36 *(5.40)*	2.82 *(4.54)*
Slip %	8.67	9.49	10.24	10.85	11.09	11.09

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	100.0	100.0
75% of Pull at Maximum Power—Ten Hours		100.0
50% of Pull at Maximum Power—Two Hours		98.5
50% of Pull at Reduced Engine Speed—Two Hours		97.5
Bystander in 12th gear		87.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th Gear											
56.24 *(41.94)*	3504 *(15.59)*	6.02 *(9.69)*	2101	5.67	3.781 *(14.312)*	0.471 *(0.287)*	14.88 *(2.930)*	191 *(88.3)*	52 *(11.1)*	68 *(19.7)*	28.940 *(97.726)*
MAXIMUM POWER IN SELECTED GEARS											
44.35 *(33.07)*	7253 *(32.26)*	2.29 *(3.69)*	2184	14.87		4th Gear		174 *(78.6)*	52 *(11.1)*	54 *(12.2)*	28.690 *(96.882)*
56.80 *(42.35)*	3541 *(15.75)*	6.02 *(9.68)*	2100	5.87		8th Gear		191 *(88.3)*	52 *(11.1)*	68 *(20.0)*	28.950 *(97.760)*

TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-30; 6; 22 *(150)*	Two 18.4-30; 6; 22 *(150)*
Ballast	—Liquid (each)	672 lb *(305 kg)*	None
	—Cast Iron (each)	110 lb *(50 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 12.4-24; 6; 20 *(140)*	Two 12.4-24; 6; 20 *(140)*
Ballast	—Liquid (each)	180 lb *(82 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		18.5 in *(470 mm)*	18.5 in *(470 mm)*
Static Weight with Operator	—Rear	5595 lb *(2538 kg)*	4030 lb *(1828 kg)*
	—Front	3050 lb *(1383 kg)*	2690 lb *(1220 kg)*
	—Total	8645 lb *(3921 kg)*	6720 lb *(3048 kg)*



Massey Ferguson 294 Diesel

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 155°F *(68.3°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1480.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1481—MASSEY FERGUSON 2640 DIESEL 16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1148 rpm)								
90.95 *(67.82)*	2400	6.222 *(23.553)*	0.480 *(0.292)*	14.62 *(2.879)*	191 *(88.1)*	58 *(14.7)*	75 *(23.7)*	28.900 *(97.591)*
Standard Power Take-off Speed (1000 rpm)—One Hour								
87.60 *(65.32)*	2091	5.540 *(20.971)*	0.443 *(0.270)*	15.81 *(3.115)*	195 *(90.7)*	57 *(13.7)*	75 *(24.1)*	28.895 *(97.574)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
78.95 *(58.87)*	2451	5.496 *(20.805)*	0.488 *(0.297)*	14.37 *(2.830)*	187 *(86.1)*	60 *(15.6)*	76 *(24.4)*	....
0.00 *(0.00)*	2556	2.076 *(7.859)*	....	....	174 *(78.6)*	60 *(15.3)*	76 *(24.2)*	....
40.35 *(30.09)*	2506	3.694 *(13.983)*	0.642 *(0.390)*	10.92 *(2.152)*	182 *(83.6)*	59 *(15.0)*	75 *(23.9)*	....
90.77 *(67.69)*	2402	6.271 *(23.738)*	0.484 *(0.295)*	14.48 *(2.852)*	188 *(86.4)*	60 *(15.6)*	76 *(24.4)*	....
20.39 *(15.20)*	2532	2.868 *(10.857)*	0.986 *(0.600)*	7.11 *(1.400)*	176 *(80.3)*	59 *(15.0)*	75 *(23.9)*	....
59.87 *(44.65)*	2478	4.469 *(16.917)*	0.523 *(0.318)*	13.40 *(2.639)*	182 *(83.6)*	60 *(15.3)*	74 *(23.6)*	....
Av 48.39 **Av *(36.08)***	**2487**	**4.145** ***(15.691)***	**0.601** ***(0.365)***	**11.67** ***(2.299)***	**182** ***(83.1)***	**59** ***(15.3)***	**75** ***(24.1)***	**28.870** ***(97.490)***

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 8th (5L) Gear											
73.48 *(54.80)*	6611 *(29.41)*	4.17 *(6.71)*	2395	7.79	6.046 *(22.886)*	0.577 *(0.351)*	12.15 *(2.394)*	191 *(88.1)*	54 *(11.9)*	67 *(19.2)*	28.915 *(97.642)*
75% of Pull at Maximum Power—Ten Hours 8th (5L) Gear											
58.18 *(43.38)*	4982 *(22.16)*	4.38 *(7.05)*	2469	5.89	5.076 *(19.213)*	0.611 *(0.372)*	11.46 *(2.258)*	185 *(84.7)*	44 *(6.8)*	49 *(9.2)*	28.972 *(97.834)*
50% of Pull at Maximum Power—Two Hours 8th (5L) Gear											
39.95 *(29.79)*	3306 *(14.71)*	4.53 *(7.29)*	2499	3.77	4.120 *(15.595)*	0.723 *(0.440)*	9.70 *(1.910)*	183 *(83.9)*	50 *(10.0)*	51 *(10.6)*	28.815 *(97.304)*
50% of Pull at Reduced Engine Speed—Two Hours 11th (6L) Gear											
39.97 *(29.81)*	3306 *(14.71)*	4.53 *(7.30)*	1630	3.73	3.121 *(11.814)*	0.547 *(0.333)*	12.81 *(2.523)*	183 *(83.9)*	55 *(12.8)*	59 *(14.7)*	28.790 *(97.220)*
MAXIMUM POWER IN SELECTED GEARS											
68.21 *(50.87)*	10623 *(47.25)*	2.41 *(3.88)*	2425	14.96	5th (3L) Gear			184 *(84.4)*	49 *(9.4)*	58 *(14.4)*	29.020 *(97.996)*
70.38 *(52.48)*	7802 *(34.71)*	3.38 *(5.44)*	2399	9.52	6th (3H) Gear			191 *(88.1)*	55 *(12.8)*	66 *(18.9)*	28.950 *(97.760)*
71.39 *(53.24)*	7563 *(33.64)*	3.54 *(5.70)*	2400	9.04	7th (4L) Gear			189 *(87.2)*	55 *(12.8)*	65 *(18.3)*	28.950 *(97.760)*
74.21 *(55.34)*	6642 *(29.55)*	4.19 *(6.74)*	2400	7.36	8th (5L) Gear			187 *(86.1)*	55 *(12.8)*	63 *(17.2)*	[illegible] *(97.760)*
71.10 *(53.02)*	5478 *(24.37)*	4.87 *(7.83)*	2398	6.21	9th (4H) Gear			190 *(87.5)*	55 *(12.8)*	[illegible] *(18.9)*	28.950 *(97.760)*
72.84 *(54.31)*	4789 *(21.30)*	5.70 *(9.18)*	2399	5.47	10th (5H) Gear			190 *(87.8)*	54 *(12.2)*	[illegible] *(19.4)*	28.960 *(97.794)*
74.83 *(55.80)*	4263 *(18.96)*	6.58 *(10.59)*	2397	4.87	11th (6L) Gear			190 *(87.8)*	54 *(12.2)*	67 *(19.4)*	28.960 *(97.794)*
70.44 *(52.53)*	2961 *(13.17)*	8.92 *(14.36)*	2401	3.50	12th (6H) Gear			190 *(87.5)*	54 *(12.2)*	67 *(19.4)*	28.956 *(97.760)*

Department of Agricultural Engineering

Dates of Test: May 9-18, 1983

Manufacturer: MASSEY FERGUSON S.A., Avenue Blaise Pascal, 60026 Beauvais, France

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8418 **Fuel weight** 7.009 lbs/gal *(0.840 kg/l)* **Oil SAE** 20-20W **API service classification** SE, SF, CC **To motor** 3.960 gal *(14.989 l)* **Drained from motor** 3.294 gal *(12.467 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran oil **Total time engine was operated** 46.5 hours.

ENGINE: Make Perkins Diesel **Type** six cylinder vertical **Serial No.** TW31040U685972J **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** 3.875" × 5.0" *(98.4 mm × 127 mm)* **Compression ratio** 16 to 1 **Displacement** 354 cu in *(5798 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: Type front wheel assist **Serial No.** *2640RWB198216* **Tread width** rear 60" *(1524 mm)* to 84" *(2134 mm)* front 63" *(1600 mm)* to 81" *(2057 mm)* **Wheel base** 107.3" *(2725 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 39.0" *(991 mm)* Vertical distance above roadway 45.8" *(1164 mm)* Horizontal distance from center of rear wheel tread 0.2" *(5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed with partial (2) range operator controlled powershift **Advertised speeds mph *(km/h)*** first 1.3 *(2.1)* second 1.8 *(2.8)* third 2.0 *(3.3)* fourth 2.7 *(4.4)* fifth 2.8 *(4.6)* sixth 3.8 *(6.1)* seventh 3.9 *(6.4)* eighth 4.6 *(7.4)* ninth 5.3 *(8.5)* tenth 6.1 *(9.8)* eleventh 7.0 *(11.3)* twelfth 9.4 *(15.1)* thirteenth 9.8 *(15.8)* fourteenth 13.1 *(21.1)* fifteenth 13.6 *(22.0)* sixteenth 18.2 *(29.4)* reverse 1.3 *(2.1)*, 1.8 *(2.8)*, 2.0 *(3.3)*, 2.7 *(4.4)*, 2.8 *(4.6)*, 3.8 *(6.1)*, 3.9 *(6.4)*, 4.6 *(7.4)*, 5.3 *(8.5)*, 6.1 *(9.8)*, 7.0 *(11.3)*, 9.4 *(15.1)* **Clutch** single dry disc operated by foot pedal **Brakes** single wet disc hydraulically actuated and operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 194.5" *(4.94 m)* left 187" *(4.75 m)* (on concrete surface without brake) right 228" *(5.79 m)* left 222" *(5.64 m)* **Turning space diameter** (on concrete surface with brake applied) right 405" *(10.28 m)* left 391" *(9.93 m)* (on concrete surface without brake) right 471" *(11.96 m)* left 459" *(11.66 m)* **Power take-off** 540 rpm at 1992 engine rpm and 1000 rpm at 2091 engine rpm.

LUGGING ABILITY IN 8th (5L) GEAR

Crankshaft Speed rpm	2400	2161	1914	1686	1436	1195	953
Pull—lbs *(kN)*	6642 *(29.55)*	7193 *(32.00)*	7722 *(34.35)*	7965 *(35.43)*	7893 *(35.11)*	8009 *(35.63)*	7521 *(33.46)*
Increase in Pull %	0	8	16	20	19	21	13
Power—Hp *(kW)*	74.21 *(55.34)*	71.64 *(53.42)*	67.59 *(50.40)*	61.13 *(45.58)*	51.62 *(38.49)*	43.49 *(32.43)*	32.79 *(24.45)*
Speed—Mph *(km/h)*	4.19 *(6.74)*	3.73 *(6.01)*	3.28 *(5.28)*	2.88 *(4.63)*	2.45 *(3.95)*	2.04 *(3.28)*	1.63 *(2.63)*
Slip %	7.36	8.35	9.18	9.46	9.46	9.46	8.91

TRACTOR SOUND LEVEL WITH CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	79.5	79.0
75% of Pull at Maximum Power—Ten Hours		80.0
50% of Pull at Maximum Power—Two Hours		79.5
50% of Pull at Reduced Engine Speed—Two Hours		76.5
Bystander in 15th (8L) gear		90.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (5L) Gear											
74.77 *(55.76)*	6498 *(28.90)*	4.32 *(6.94)*	2399	5.34	6.010 *(22.751)*	0.563 *(0.343)*	12.44 *(2.451)*	190 *(87.8)*	54 *(12.2)*	66 *(18.6)*	28.865 *(97.473)*
MAXIMUM POWER IN SELECTED GEARS											
63.80 *(47.58)*	13707 *(60.97)*	1.75 *(2.81)*	2439	14.86	3rd (2L) Gear			183 *(83.9)*	47 *(8.3)*	54 *(12.2)*	29.010 *(97.962)*
75.56 *(56.35)*	6568 *(29.22)*	4.31 *(6.94)*	2399	5.34	8th (5L) Gear			187 *(86.1)*	54 *(12.2)*	60 *(15.6)*	28.940 *(97.726)*

TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-38; 8; 20 *(140)*	Two 18.4-38; 8; 20 *(140)*
Ballast	—Liquid (each)	1338 lb *(607 kg)*	None
	—Cast Iron (each)	112 lb *(51 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 13.6-28; 8; 22 *(150)*	Two 13.6-28; 8; 22 *(150)*
Ballast	—Liquid (each)	522 lb *(237 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		23 in *(585 mm)*	23 in *(585 mm)*
Static Weight with Operator	—Rear	10815 lb *(4906 kg)*	7915 lb *(3590 kg)*
	—Front	5565 lb *(2524 kg)*	4520 lb *(2050 kg)*
	—Total	16380 lb *(7430 kg)*	12435 lb *(5640 kg)*

REPAIRS and ADJUSTMENTS: No repairs and adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 149°F *(65.1°C)*. Eight gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1481.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Massey Ferguson 2640 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1482
VERSATILE 835 SERIES 3 DIESEL
12 SPEED
(SERIAL NUMBERS 835 83 036769 and HIGHER)

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1009 rpm)								
200.50 *(149.36)*	2100	12.665 *(47.942)*	0.443 *(0.270)*	15.82 *(3.115)*	183 *(83.8)*	62 *(16.7)*	75 *(23.9)*	28.783 *(97.197)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
177.47 *(132.34)*	2190	12.085 *(45.747)*	0.477 *(0.290)*	14.69 *(2.893)*	181 *(82.8)*	62 *(16.9)*	78 *(25.8)*	....
0.00 *(0.00)*	2306	4.225 *(15.993)*	....	....	176 *(79.7)*	62 *(16.9)*	74 *(23.6)*	....
91.54 *(68.26)*	2256	8.724 *(33.024)*	0.668 *(0.406)*	10.49 *(2.067)*	178 *(81.1)*	61 *(16.1)*	72 *(22.5)*	....
200.42 *(149.45)*	2099	12.783 *(48.389)*	0.447 *(0.272)*	15.68 *(3.089)*	182 *(83.6)*	61 *(16.1)*	74 *(23.1)*	....
46.05 *(34.34)*	2276	6.507 *(24.632)*	0.990 *(0.602)*	7.08 *(1.394)*	176 *(80.3)*	59 *(15.0)*	72 *(22.5)*	....
135.74 *(101.22)*	2232	10.569 *(40.008)*	0.546 *(0.332)*	12.84 *(2.530)*	180 *(81.9)*	62 *(16.9)*	78 *(25.8)*	....
Av 108.54 ***Av (80.94)***	**2226**	**9.149** ***(34.633)***	**0.591** ***(0.359)***	**11.86** ***(2.337)***	**179** ***(81.6)***	**61** ***(16.3)***	**75** ***(23.9)***	**28.773** ***(97.163)***

DRAWBAR PERFORMANCE AT 2100 RPM

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 7th (2-3) Gear											
178.82 *(133.35)*	10829 *(48.17)*	6.19 *(9.97)*	2100	2.97	12.379 *(46.859)*	0.485 *(0.295)*	14.45 *(2.846)*	185 *(84.7)*	64 *(17.5)*	74 *(23.3)*	28.670 *(96.814)*
75% of Pull at Maximum Power—Ten Hours 7th (2-3) Gear											
144.06 *(107.42)*	8195 *(36.45)*	6.59 *(10.61)*	2217	2.13	11.309 *(42.807)*	0.550 *(0.335)*	12.74 *(2.509)*	184 *(84.4)*	62 *(16.9)*	77 *(24.8)*	28.815 *(97.304)*
50% of Pull at Maximum Power—Two Hours 7th (2-3) Gear											
98.40 *(73.38)*	5464 *(24.31)*	6.75 *(10.87)*	2261	1.78	9.418 *(35.650)*	0.671 *(0.408)*	10.45 *(2.058)*	183 *(83.9)*	56 *(13.3)*	66 *(18.9)*	28.970 *(97.827)*
50% of Pull at Reduced Engine Speed—Two Hours 11th (3-3) Gear											
98.44 *(73.40)*	5464 *(24.31)*	6.76 *(10.87)*	1162	1.62	6.154 *(23.294)*	0.438 *(0.266)*	16.00 *(3.151)*	184 *(84.4)*	60 *(15.6)*	72 *(22.2)*	28.925 *(97.675)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
155.98 *(116.32)*	25687 *(114.26)*	2.28 *(3.66)*	2137	14.96	1st (1-1) Gear	182 *(83.1)*	50 *(10.0)*	55 *(12.8)*	28.960 *(97.794)*
167.03 *(124.55)*	22809 *(101.46)*	2.75 *(4.42)*	2099	10.14	2nd (1-2) Gear	183 *(83.9)*	52 *(11.1)*	59 *(15.0)*	28.970 *(97.827)*
172.76 *(128.83)*	19980 *(88.88)*	3.24 *(5.22)*	2098	7.56	3rd (1-3) Gear	186 *(85.6)*	63 *(17.2)*	81 *(27.2)*	28.760 *(97.118)*
177.14 *(132.09)*	17235 *(76.66)*	3.85 *(6.20)*	2099	5.63	4th (1-4) Gear	187 *(85.8)*	63 *(17.2)*	80 *(26.7)*	28.760 *(97.118)*
180.74 *(134.78)*	14859 *(66.09)*	4.56 *(7.34)*	2098	4.28	5th (2-1) Gear	185 *(85.0)*	62 *(16.7)*	78 *(25.6)*	28.770 *(97.152)*
181.14 *(135.08)*	12710 *(56.53)*	5.34 *(8.60)*	2098	3.51	6th (2-2) Gear	186 *(85.6)*	62 *(16.7)*	77 *(25.0)*	28.770 *(97.152)*
180.50 *(134.60)*	10927 *(48.60)*	6.19 *(9.97)*	2090	2.89	7th (2-3) Gear	185 *(85.0)*	64 *(17.8)*	74 *(23.3)*	28.650 *(96.747)*
177.53 *(132.38)*	9205 *(40.94)*	7.23 *(11.64)*	2098	2.42	8th (2-4) Gear	185 *(85.0)*	64 *(17.8)*	74 *(23.3)*	28.640 *(96.713)*
174.50 *(130.12)*	7171 *(31.90)*	9.13 *(14.69)*	2100	1.62	9th (3-1) Gear	184 *(84.4)*	65 *(18.3)*	73 *(22.8)*	28.630 *(96.679)*

LUGGING ABILITY IN 7th (2-3) GEAR

Crankshaft Speed rpm	2090	1888	1679	1472	1256	1042
Pull—lbs *(kN)*	10927 *(48.60)*	12863 *(57.22)*	14668 *(65.25)*	16259 *(72.32)*	16190 *(72.02)*	15271 *(67.93)*
Increase in Pull %	0	18	34	49	48	40
Power—Hp *(kW)*	180.50 *(134.60)*	189.89 *(141.60)*	191.21 *(142.59)*	184.65 *(137.68)*	156.77 *(116.90)*	123.06 *(91.77)*
Speed—Mph *(km/h)*	6.19 *(9.97)*	5.54 *(8.91)*	4.89 *(7.87)*	4.26 *(6.85)*	3.63 *(5.84)*	3.02 *(4.86)*
Slip %	2.89	3.51	4.13	4.73	4.88	4.58

Department of Agricultural Engineering

Dates of Test: May 31 to June 9, 1983

Manufacturer: VERSATILE FARM EQUIPMENT COMPANY, 1260 Clarence Avenue, Winnipeg, Manitoba, Canada R3T 1T3

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8417 **Fuel weight** 7.008 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** SE-SF, CC-CD **To motor** 7.297 gal *(27.623 l)* **Drained from motor** 6.794 gal *(25.716 l)* **Transmission and hydraulic lubricant** Versatile HyGear 23 or equivalent **Final drive lubricant** SAE 85W140 **Total time engine was operated** 47.0 hours.

ENGINE: Make Cummins Diesel **Type** six cylinder vertical with turbocharger **Serial No.** 11080966 **Crankshaft** lengthwise **Rated rpm** 1750 to 2100 **Bore and stroke** 5.5" × 6.0" *(139.7 mm × 152.4 mm)* **Compression ratio** 14.1 to 1 **Displacement** 855 cu in *(14013 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** one full flow cartridge and one bypass cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper cartridges **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type four wheel drive with duals **Serial No.** 835 83 036769 **Tread width** rear 72" *(1829 mm)* to 118" *(3000 mm)* front 72" *(1829 mm)* to 118" *(3000 mm)* **Wheel base** 130" *(3302 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 78" *(1980 mm)* Vertical distance above roadway 42" *(1067 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** *(km/h)* first 2.6 *(4.2)* second 3.0 *(4.8)* third 3.5 *(5.7)* fourth 4.1 *(6.6)* fifth 4.7 *(7.6)* sixth 5.5 *(8.9)* seventh 6.3 *(10.1)* eighth 7.3 *(11.7)* ninth 9.2 *(14.8)* tenth 10.7 *(17.2)* eleventh 12.3 *(19.8)* twelfth 14.3 *(23.0)* reverse 3.4 *(5.5)*, 3.9 *(6.2)*, 4.5 *(7.2)*, 5.2 *(8.4)* **Clutch** dual dry disc operated by foot pedal **Brakes** dual caliper disc hydraulically operated by foot pedal and mechanically by hand lever **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 236" *(5.99 m)* left 236" *(5.99 m)* **Turning space diameter** (on concrete surface without brake) right 490" *(12.45 m)* left 490" *(12.45 m)* **Power take-off** 1009 rpm at 2100 engine rpm.

TRACTOR SOUND LEVEL WITH CAB	1750 RPM dB(A)	1900 RPM dB(A)	2100 RPM dB(A)
Maximum Available Power—Two Hours	80.0	82.0	82.5
75% of Pull at Maximum Power—Ten Hours			82.5
50% of Pull at Maximum Power—Two Hours			83.0
50% of Pull at Reduced Engine Speed—Two Hours			81.0
Bystander in 12th (3-4) gear			88.5

SUPPLEMENTARY TESTS
DRAWBAR PERFORMANCE AT 1900 RPM

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 7th (2-3) Gear											
187.46 *(139.79)*	12618 *(56.13)*	5.57 *(8.97)*	1900	3.47	12.075 *(45.711)*	0.451 *(0.275)*	15.52 *(3.058)*	184 *(84.2)*	60 *(15.3)*	68 *(20.0)*	28.730 *(97.017)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
165.79 *(123.63)*	25139 *(111.82)*	2.47 *(3.98)*	1994	14.72	2nd (1-2) Gear	183 *(83.6)*	51 *(10.6)*	57 *(13.9)*	28.960 *(97.794)*
175.17 *(130.63)*	23112 *(102.81)*	2.84 *(4.57)*	1898	10.54	3rd (1-3) Gear	183 *(83.9)*	54 *(12.2)*	64 *(17.8)*	28.980 *(97.861)*
179.89 *(134.14)*	19704 *(87.65)*	3.42 *(5.51)*	1901	7.57	4th (1-4) Gear	187 *(86.1)*	63 *(17.2)*	80 *(26.7)*	28.760 *(97.118)*
185.99 *(138.69)*	17106 *(76.09)*	4.08 *(6.56)*	1898	5.56	5th (2-1) Gear	186 *(85.6)*	63 *(17.2)*	79 *(26.1)*	28.770 *(97.152)*
189.32 *(141.17)*	14794 *(65.80)*	4.80 *(7.72)*	1899	4.36	6th (2-2) Gear	187 *(86.1)*	62 *(16.7)*	77 *(25.0)*	28.770 *(97.152)*
189.04 *(140.97)*	12733 *(56.64)*	5.57 *(8.96)*	1898	3.51	7th (2-3) Gear	185 *(85.0)*	64 *(17.8)*	74 *(23.3)*	28.650 *(96.747)*
187.32 *(139.69)*	10790 *(47.99)*	6.51 *(10.43)*	1899	2.81	8th (2-4) Gear	185 *(85.0)*	64 *(17.8)*	74 *(23.3)*	28.640 *(96.713)*
186.05 *(138.74)*	8491 *(37.77)*	8.22 *(13.22)*	1899	1.94	9th (3-1) Gear	185 *(84.7)*	65 *(18.3)*	73 *(22.8)*	28.630 *(96.679)*

DRAWBAR PERFORMANCE AT 1750 RPM

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 7th (2-3) Gear											
188.51 *(140.57)*	13844 *(61.58)*	5.11 *(8.22)*	1750	3.94	11.701 *(44.293)*	0.435 *(0.265)*	16.11 *(3.174)*	185 *(85.0)*	63 *(16.9)*	76 *(24.4)*	28.760 *(97.118)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
169.95 *(126.73)*	25120 *(111.74)*	2.54 *(4.08)*	1779	14.84	3rd (1-3) Gear	184 *(84.2)*	53 *(11.7)*	61 *(16.1)*	28.970 *(97.827)*
176.81 *(131.85)*	21513 *(95.69)*	3.08 *(4.96)*	1750	9.53	4th (1-4) Gear	188 *(86.7)*	63 *(17.2)*	81 *(27.2)*	28.760 *(97.118)*
186.10 *(138.78)*	18747 *(83.39)*	3.72 *(5.99)*	1750	6.51	5th (2-1) Gear	188 *(86.4)*	63 *(17.2)*	79 *(26.1)*	28.760 *(97.118)*
189.82 *(141.55)*	16188 *(72.01)*	4.40 *(7.08)*	1752	5.03	6th (2-2) Gear	187 *(86.1)*	62 *(16.7)*	78 *(25.6)*	28.770 *(97.152)*
190.67 *(142.18)*	14006 *(62.30)*	5.11 *(8.22)*	1749	4.05	7th (2-3) Gear	186 *(85.3)*	64 *(17.8)*	74 *(23.3)*	28.650 *(96.747)*
190.49 *(142.05)*	11945 *(53.13)*	5.98 *(9.62)*	1750	3.20	8th (2-4) Gear	186 *(85.6)*	65 *(18.3)*	73 *(22.8)*	28.640 *(96.713)*
188.93 *(140.89)*	9386 *(41.75)*	7.55 *(12.15)*	1748	2.26	9th (3-1) Gear	185 *(85.0)*	65 *(18.3)*	73 *(22.8)*	28.630 *(96.679)*
186.77 *(139.28)*	7956 *(35.39)*	8.80 *(14.17)*	1748	1.78	10th (3-2) Gear	185 *(85.0)*	65 *(18.3)*	73 *(22.8)*	28.630 *(96.679)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 18.4-38; 8; inner 14 *(95)* outer 12 *(83)*	Four 18.4-38; 8; inner 14 *(95)* outer 12 *(83)*
Ballast	—Liquid (each inner)	985 lb *(447 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Four 18.4-38; 8; inner 14 *(95)* outer 12 *(83)*	Four 18.4-38; 8; inner 14 *(95)* outer 12 *(83)*
Ballast	—Liquid (each inner)	815 lb *(369 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		17 in *(430 mm)*	17 in *(430 mm)*
Static Weight with Operator	—Rear	11830 lb *(5366 kg)*	9860 lb *(4472 kg)*
	—Front	16150 lb *(7326 kg)*	14525 lb *(6589 kg)*
	—Total	27980 lb *(12692 kg)*	24385 lb *(11061 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 141°F *(60.8°C)*. Nine gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. The performance figures on this report apply to tractor chassis Serial No. 835 83 036769 and higher.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1482**.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

Versatile 835 Series 3 Diesel

NEBRASKA TRACTOR TEST 1483
VERSATILE 875 SERIES 3 DIESEL
12 SPEED
(SERIAL NUMBERS 875 83 057906 and HIGHER)

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1006 rpm)								
252.67 (188.42)	2100	15.022 (56.864)	0.417 (0.254)	16.82 (3.314)	183 (84.8)	62 (16.9)	76 (24.3)	28.680 (96.8[illegible])
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
223.32 (166.53)	2183	14.078 (53.291)	0.442 (0.269)	15.86 (3.125)	182 (83.1)	63 (17.2)	76 (24.2)	…… ……
0.00 (0.00)	2297	4.091 (15.486)	…… ……	…… ……	176 (79.7)	63 (17.2)	76 (24.4)	…… ……
114.55 (85.42)	2242	9.850 (37.286)	0.603 (0.367)	11.63 (2.291)	178 (81.1)	64 (17.8)	77 (25.0)	…… ……
249.36 (185.95)	2100	15.178 (57.455)	0.427 (0.260)	16.43 (3.236)	183 (83.9)	62 (16.9)	74 (23.3)	…… ……
57.96 (43.22)	2264	6.898 (26.112)	0.834 (0.508)	8.40 (1.655)	176 (80.0)	62 (16.4)	74 (23.3)	…… ……
170.07 (126.82)	2217	12.323 (46.648)	0.508 (0.309)	13.80 (2.719)	181 (82.8)	63 (17.2)	76 (24.2)	…… ……
Av 135.88 *Av* (101.33)	2217	10.403 (39.380)	0.537 (0.327)	13.06 (2.573)	179 (81.8)	63 (17.1)	75 (24.1)	28.657 (96.770)

DRAWBAR PERFORMANCE AT 2100 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (2-3) Gear											
224.08 (167.10)	12851 (57.16)	6.54 (10.52)	2099	3.18	14.691 (55.612)	0.460 (0.280)	15.25 (3.005)	186 (85.3)	58 (14.4)	70 (21.1)	28.910 (97.625)
75% of Pull at Maximum Power—Ten Hours 7th (2-3) Gear											
179.79 (134.07)	9737 (43.31)	6.92 (11.14)	2203	2.28	13.090 (49.552)	0.510 (0.310)	13.73 (2.706)	186 (85.7)	68 (19.9)	82 (27.8)	28.841 (97.392)
50% of Pull at Maximum Power—Two Hours 7th (2-3) Gear											
122.62 (91.44)	6492 (28.88)	7.08 (11.40)	2236	1.54	10.377 (39.280)	0.593 (0.361)	11.82 (2.328)	184 (84.4)	64 (17.8)	81 (27.2)	28.845 (97.405)
50% of Pull at Reduced Engine Speed—Two Hours 11th (3-3) Gear											
122.69 (91.49)	6492 (28.88)	7.09 (11.41)	1149	1.46	7.399 (28.009)	0.423 (0.257)	16.58 (3.267)	186 (85.3)	66 (18.6)	84 (28.9)	28.815 (97.304)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
198.49 (148.02)	26725 (118.88)	2.79 (4.48)	2119	14.68	2nd (1-2) Gear	185 (85.0)	64 (17.8)	69 (20.6)	28.880 (97.523)
216.49 (161.43)	23854 (106.11)	3.40 (5.48)	2099	8.51	3rd (1-3) Gear	184 (84.4)	61 (16.1)	70 (21.1)	28.860 (97.456)
220.29 (164.27)	20273 (90.18)	4.07 (6.56)	2099	5.70	4th (1-4) Gear	184 (84.4)	57 (13.9)	64 (17.8)	28.860 (97.456)
225.73 (168.33)	17584 (78.22)	4.81 (7.73)	2099	4.76	5th (2-1) Gear	187 (86.1)	63 (17.2)	82 (27.8)	28.820 (97.321)
227.48 (169.63)	15107 (67.20)	5.65 (9.09)	2099	3.71	6th (2-2) Gear	188 (86.7)	63 (17.2)	81 (27.2)	28.830 (97.355)
226.35 (168.79)	12983 (57.75)	6.54 (10.52)	2098	3.13	7th (2-3) Gear	187 (86.1)	61 (16.1)	78 (25.6)	28.860 (97.456)
224.81 (167.64)	11042 (49.12)	7.63 (12.29)	2099	2.64	8th (2-4) Gear	187 (86.1)	62 (16.7)	80 (26.7)	28.850 (97.422)
221.70 (165.32)	8630 (38.39)	9.63 (15.50)	2099	1.97	9th (3-1) Gear	187 (86.1)	63 (17.2)	81 (27.2)	28.840 (97.388)

LUGGING ABILITY IN 7th (2-3) GEAR

Crankshaft Speed rpm	2098	1887	1683	1471	1256	1048
Pull—lbs (kN)	12983 (57.75)	15067 (67.02)	16659 (74.10)	17675 (78.62)	17212 (76.56)	16142 (71.80)
Increase in Pull %	0	16	28	36	33	24
Power—Hp (kW)	226.35 (168.79)	234.79 (175.08)	230.06 (171.55)	212.49 (158.45)	176.96 (131.96)	138.96 (103.62)
Speed—Mph (km/h)	6.54 (10.52)	5.84 (9.40)	5.18 (8.33)	4.51 (7.26)	3.86 (6.20)	3.23 (5.20)
Slip %	3.13	3.71	4.36	4.83	4.68	4.36

Department of Agricultural Engineering

Dates of Test: May 31 to June 10, 1983

Manufacturer: VERSATILE FARM EQUIPMENT COMPANY, 1260 Clarence Avenue, Winnipeg, Manitoba, Canada R3T 1T3

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8420 **Fuel weight** 7.011 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** SE-SF, CC-CD **To motor** 7.334 gal *(27.762 l)* **Drained from motor** 6.906 gal *(26.141 l)* **Transmission and hydraulic lubricant** Versatile Hygear 23 or equivalent **Final drive lubricant** SAE 85W140 **Total time engine was operated** 41.0 hours.

ENGINE: Make Cummins Diesel **Type** six cylinder vertical with turbocharger **Serial No.** 11084147 **Crankshaft** lengthwise **Rated rpm** 1750 to 2100 **Bore and stroke** 5.5" × 6.0" *(139.7 mm × 152.4 mm)* **Compression ratio** 14.1 to 1 **Displacement** 855 cu in *(14013 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** one full flow cartridge and one bypass cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two paper cartridges **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type four wheel drive with duals **Serial No.** 875 83 058000 **Tread width** rear 72" *(1829 mm)* to 122" *(3099 mm)* front 72" *(1829 mm)* to 122" *(3099 mm)* **Wheel base** 130" *(3302 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 77" *(1960 mm)* Vertical distance above roadway 42" *(1067 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** *(km/h)* first 2.7 *(4.3)* second 3.1 *(5.0)* third 3.6 *(5.8)* fourth 4.1 *(6.6)* fifth 4.8 *(7.7)* sixth 5.6 *(9.0)* seventh 6.5 *(10.5)* eighth 7.5 *(12.1)* ninth 9.4 *(15.1)* tenth 10.9 *(17.5)* eleventh 12.6 *(20.3)* twelfth 14.6 *(23.5)* reverse 3.5 *(5.6)*, 4.0 *(6.4)*, 4.6 *(7.4)*, 5.4 *(8.7)* **Clutch** dual dry disc operated by foot pedal **Brakes** dual caliper disc hydraulically operated by foot pedal and mechanically by hand lever **Steering** hydrostatic and articulated **Turning radius** (on concrete surface without brake) right 239" *(6.07 m)* left 239" *(6.07 m)* **Turning space diameter** (on concrete surface without brake) right 490" *(12.45 m)* left 490" *(12.45 m)* **Power take-off** 1008 rpm at 2100 engine rpm.

TRACTOR SOUND LEVEL WITH CAB	1750 RPM dB(A)	1900 RPM dB(A)	2100 RPM dB(A)
Maximum Available Power—Two Hours	83.0	80.5	82.5
75% of Pull at Maximum Power—Ten Hours			82.5
50% of Pull at Maximum Power—Two Hours			81.5
50% of Pull at Reduced Engine Speed—Two Hours			79.0
Bystander in 12th (3-4) gear			89.0

SUPPLEMENTARY TESTS
DRAWBAR PERFORMANCE AT 1900 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (2-3) Gear											
231.99 (172.99)	14785 (65.76)	5.88 (9.47)	1900	3.79	14.352 (54.330)	0.434 (0.264)	16.16 (3.184)	187 (86.1)	61 (16.1)	77 (24.7)	28.880 (97.523)
MAXIMUM POWER IN SELECTED GEARS											
206.98 (154.34)	26606 (118.35)	2.92 (4.69)	1937	15.00	3rd (1-3) Gear			186 (85.6)	65 (18.3)	70 (21.1)	28.890 (97.557)
225.76 (168.35)	23482 (104.45)	3.61 (5.80)	1899	7.77	4th (1-4) Gear			185 (84.7)	58 (14.4)	66 (18.9)	28.860 (97.456)
228.33 (170.26)	19923 (88.62)	4.30 (6.92)	1899	5.94	5th (2-1) Gear			188 (86.7)	63 (17.2)	82 (27.8)	28.810 (97.287)
233.85 (174.38)	17304 (76.97)	5.07 (8.16)	1899	4.60	6th (2-2) Gear			188 (86.7)	63 (17.2)	81 (27.2)	28.830 (97.355)
234.67 (174.99)	14959 (66.54)	5.88 (9.47)	1899	3.63	7th (2-3) Gear			189 (87.2)	62 (16.7)	79 (26.1)	28.850 (97.422)
233.65 (174.23)	12743 (56.68)	6.88 (11.07)	1899	2.97	8th (2-4) Gear			188 (86.7)	62 (16.7)	80 (26.7)	28.840 (97.388)
231.21 (172.42)	9986 (44.42)	8.68 (13.97)	1898	2.30	9th (3-1) Gear			189 (86.9)	63 (17.2)	81 (27.2)	28.840 (97.388)

DRAWBAR PERFORMANCE AT 1750 RPM

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (2-3) Gear											
229.39 (171.06)	15957 (70.98)	5.39 (8.68)	1751	4.27	13.800 (52.238)	0.422 (0.257)	16.62 (3.275)	188 (86.7)	63 (16.9)	76 (24.4)	28.860 (97.456)
MAXIMUM POWER IN SELECTED GEARS											
206.18 (153.75)	26293 (116.95)	2.94 (4.73)	1948	14.81	3rd (1-3) Gear			187 (85.8)	66 (18.9)	72 (22.2)	28.900 (97.591)
217.62 (162.28)	25182 (112.02)	3.24 (5.22)	1750	10.10	4th (1-4) Gear			186 (85.6)	60 (15.6)	68 (20.0)	28.860 (97.456)
224.32 (167.27)	21478 (95.54)	3.92 (6.30)	1749	6.94	5th (2-1) Gear			188 (86.7)	63 (17.2)	82 (27.8)	28.810 (97.287)
229.17 (170.89)	18506 (82.32)	4.64 (7.47)	1751	5.15	6th (2-2) Gear			189 (87.2)	63 (17.2)	81 (27.2)	28.820 (97.321)
231.95 (172.97)	16140 (71.79)	5.39 (8.67)	1748	4.19	7th (2-3) Gear			189 (87.2)	62 (16.7)	79 (26.1)	28.850 (97.422)
232.12 (173.09)	13759 (61.20)	6.33 (10.18)	1755	3.38	8th (2-4) Gear			189 (87.2)	62 (16.7)	80 (26.7)	28.840 (97.388)
230.25 (171.70)	10823 (48.14)	7.98 (12.84)	1748	2.39	9th (3-1) Gear			190 (87.8)	63 (17.2)	81 (27.2)	28.830 (97.355)
228.65 (170.50)	9211 (40.97)	9.31 (14.98)	1748	1.97	10th (3-2) Gear			188 (86.4)	63 (17.2)	81 (27.2)	28.830 (97.355)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Four 20.8-38; 8; inner 14 *(95)*; outer 12 *(83)*	Four 20.8-38; 8; inner 14 *(95)*; outer 12 *(83)*
Ballast	—Liquid (each inner)	1170 lb *(531 kg)*	None
	—Cast Iron (each)	None	None
Front Tires	—No., size, ply & psi *(kPa)*	Four 20.8-38; 8; inner 14 *(95)*; outer 12 *(83)*	Four 20.8-38; 8; inner 14 *(95)*; outer 12 *(83)*
Ballast	—Liquid (each inner)	765 lb *(347 kg)*	None
	—Cast Iron (each)	None	None
Height of Drawbar		19.5 in *(495 mm)*	19.5 in *(495 mm)*
Static Weight with Operator	—Rear	12815 lb *(5813 kg)*	10475 lb *(4752 kg)*
	—Front	16685 lb *(7568 kg)*	15155 lb *(6874 kg)*
	—Total	29500 lb *(13381 kg)*	25630 lb *(11626 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

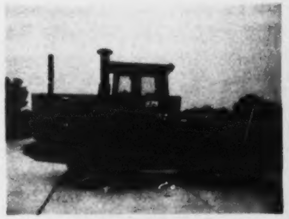
REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 137°F *(58.3°C)*. Eight gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. The performance figures on this report apply to tractor chassis Serial No. 875 83 057906 and higher.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1483.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director



Versatile 875 Series 3 Diesel

NEBRASKA TRACTOR TEST 1484—HESSTON 466 DT FIAT DIESEL
ALSO HESSTON 466, 466 DT/L AND 466/L FIAT MODELS
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—638 rpm)								
45.13 *(33.65)*	2600	2.948 *(11.159)*	0.458 *(0.278)*	15.31 *(3.016)*	187 *(86.1)*	60 *(15.7)*	75 *(24.0)*	28.870 *(97.490)*
Standard Power Take-off Speed (540 rpm)—One Hour								
42.68 *(31.83)*	2199	2.550 *(9.653)*	0.419 *(0.255)*	16.74 *(3.297)*	184 *(84.6)*	61 *(16.1)*	75 *(24.1)*	28.880 *(97.523)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
39.67 *(29.58)*	2688	2.607 *(9.869)*	0.461 *(0.280)*	15.22 *(2.997)*	182 *(83.1)*	64 *(17.5)*	75 *(23.9)*	....
0.00 *(0.00)*	2963	1.045 *(3.956)*	....	....	166 *(74.7)*	64 *(18.1)*	76 *(24.2)*	....
20.84 *(15.54)*	2825	1.734 *(6.564)*	0.583 *(0.355)*	12.02 *(2.367)*	171 *(77.2)*	63 *(17.2)*	75 *(23.9)*	....
45.37 *(33.83)*	2600	2.950 *(11.167)*	0.456 *(0.277)*	15.38 *(3.029)*	188 *(86.9)*	62 *(16.7)*	75 *(23.9)*	....
10.75 *(8.02)*	2910	1.370 *(5.186)*	0.893 *(0.543)*	7.85 *(1.546)*	167 *(75.0)*	65 *(18.3)*	75 *(23.9)*	....
30.42 *(22.68)*	2747	2.141 *(8.105)*	0.493 *(0.300)*	14.21 *(2.798)*	176 *(79.7)*	64 *(17.8)*	75 *(23.9)*	....
Av 24.51 *Av (18.28)*	2789	1.974 *(7.472)*	0.565 *(0.343)*	12.41 *(2.446)*	175 *(79.4)*	64 *(17.6)*	75 *(23.9)*	28.867 *(97.546)*

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th (III-1) Gear											
39.48 *(29.44)*	2561 *(11.39)*	5.78 *(9.30)*	2601	5.10	2.890 *(10.940)*	0.513 *(0.312)*	13.66 *(2.691)*	189 *(87.2)*	65 *(18.1)*	73 *(22.5)*	28.960 *(97.794)*
75% of Pull at Maximum Power—Ten Hours 8th (III-1) Gear											
31.36 *(23.39)*	1946 *(8.66)*	6.04 *(9.73)*	2601	4.08	2.437 *(9.224)*	0.544 *(0.331)*	12.87 *(2.535)*	184 *(84.5)*	66 *(19.0)*	73 *(22.7)*	28.899 *(97.588)*
50% of Pull at Maximum Power—Two Hours 8th (III-1) Gear											
21.87 *(16.31)*	1297 *(5.77)*	6.32 *(10.18)*	2781	2.83	1.998 *(7.563)*	0.640 *(0.389)*	10.95 *(2.157)*	177 *(80.6)*	66 *(18.9)*	71 *(21.4)*	28.950 *(97.760)*
50% of Pull at Reduced Engine Speed—Two Hours 10th (III-2) Gear											
21.88 *(16.32)*	1297 *(5.77)*	6.33 *(10.18)*	1804	2.79	1.552 *(5.875)*	0.497 *(0.302)*	14.10 *(2.777)*	176 *(79.7)*	65 *(18.3)*	72 *(21.9)*	28.935 *(97.709)*
MAXIMUM POWER IN SELECTED GEARS											
30.68 *(22.88)*	4969 *(22.10)*	2.32 *(3.73)*	2716	14.96	4th (II-1) Gear			182 *(83.1)*	71 *(21.7)*	75 *(23.9)*	28.730 *(97.017)*
36.67 *(27.35)*	4751 *(21.13)*	2.89 *(4.66)*	2599	12.46	5th (I-4) Gear			186 *(85.6)*	72 *(22.2)*	77 *(25.0)*	28.730 *(97.017)*
38.94 *(29.04)*	3970 *(17.66)*	3.68 *(5.92)*	2599	8.27	6th (II-2) Gear			188 *(86.4)*	64 *(17.8)*	68 *(20.0)*	28.950 *(97.760)*
39.07 *(29.14)*	3180 *(14.14)*	4.61 *(7.42)*	2600	6.32	7th (II-3) Gear			189 *(86.9)*	63 *(17.2)*	68 *(20.0)*	28.950 *(97.760)*
40.03 *(29.85)*	2594 *(11.54)*	5.79 *(9.31)*	2600	4.92	8th (III-1) Gear			187 *(86.1)*	62 *(16.7)*	67 *(19.4)*	28.970 *(97.827)*
38.74 *(28.89)*	1995 *(8.87)*	7.29 *(11.73)*	2599	3.91	9th (II-4) Gear			188 *(86.7)*	62 *(16.7)*	67 *(19.4)*	28.960 *(97.794)*
38.64 *(28.82)*	1594 *(7.09)*	9.09 *(14.63)*	2602	3.15	10th (III-2) Gear			187 *(86.1)*	63 *(17.2)*	68 *(20.0)*	28.960 *(97.794)*

Department of Agricultural Engineering

Dates of Test: June 9-22, 1983

Manufacturer: FIAT TRATTORI S.p.A., Via Pico della Mirandola, 72-41100 Modena, Italy

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8416 **Fuel weight** 7.007 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** SE-SF, CC-CD **To motor** 1.723 gal *(6.524 l)* **Drained from motor** 1.458 gal *(5.518 l)* **Transmission and final drive lubricant** API 303 hydraulic fluid **Total time engine was operated** 38.5 hours.

ENGINE: Make Fiat Diesel **Type** three cylinder vertical **Serial No.** 8035.02*376-100744* **Crankshaft** lengthwise **Rated rpm** 2600 **Bore and stroke** 3.94" × 4.33" *(100 mm × 110 mm)* **Compression ratio** 17 to 1 **Displacement** 158 cu in *(2592 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type front wheel assist **Serial No.** *466DT/12*370008* **Tread width** rear 56.1" *(1425 mm)* to 75.8" *(1925 mm)* front 56.9" *(1445 mm)* to 73.8" *(1875 mm)* **Wheel base** 83.4" *(2119 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 32.0" *(813 mm)* Vertical distance above roadway 32.5" *(825 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 1.1 *(1.7)* second 1.7 *(2.7)* third 2.1 *(3.3)* fourth 2.5 *(4.1)* fifth 3.2 *(5.1)* sixth 3.9 *(6.3)* seventh 4.8 *(7.7)* eighth 5.9 *(9.5)* ninth 7.4 *(11.8)* tenth 9.1 *(14.6)* eleventh 11.1 *(17.9)* twelfth 17.2 *(27.6)* reverse 2.8 *(4.5)*, 4.3 *(6.9)*, 5.3 *(8.5)*, 8.2 *(13.2)* **Clutch** dry disc operated by foot pedal **Brakes** wet disc operated by two foot pedals which can be locked together and hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 128.5" *(3.26 m)* left 128.5" *(3.26 m)* (on concrete surface without brake) right 203" *(5.16 m)* left 203" *(5.16 m)* **Turning space diameter** (on concrete surface with brake applied) right 267" *(6.78 m)* left 267" *(6.78 m)* (on concrete surface without brake) right 416" *(10.57 m)* left 416" *(10.57 m)* **Power take-off** 540 rpm at 2199 engine rpm.

LUGGING ABILITY IN 8th (III-1) GEAR

Crankshaft Speed rpm	2600	2349	2077	1819	1565	1301	1034
Pull—lbs *(kN)*	2594 *(11.54)*	2804 *(12.47)*	3000 *(13.34)*	3124 *(13.90)*	3312 *(14.73)*	3421 *(15.22)*	3151 *(14.02)*
Increase in Pull %	0	8	16	20	28	32	21
Power—Hp *(kW)*	40.03 *(29.85)*	38.87 *(28.99)*	36.65 *(27.33)*	33.34 *(24.86)*	30.25 *(22.56)*	25.90 *(19.31)*	19.05 *(14.21)*
Speed—Mph *(km/h)*	5.79 *(9.31)*	5.20 *(8.37)*	4.58 *(7.37)*	4.00 *(6.44)*	3.43 *(5.51)*	2.84 *(4.57)*	2.27 *(3.65)*
Slip %	4.92	5.47	5.84	6.08	6.56	6.80	6.32

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB (A)
Maximum Available Power—Two Hours	96.5	96.0
75% of Pull at Maximum Power—Ten Hours		95.5
50% of Pull at Maximum Power—Two Hours		94.5
50% of Pull at Reduced Engine Speed—Two Hours		90.5
Bystander in 12th (III-4) gear		86.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th (III-1) Gear											
38.44 *(28.67)*	2454 *(10.92)*	5.87 *(9.45)*	2600	4.47	2.890 *(10.940)*	0.527 *(0.320)*	13.30 *(2.620)*	191 *(88.1)*	74 *(23.1)*	81 *(27.2)*	28.745 *(97.068)*
MAXIMUM POWER IN SELECTED GEARS											
35.47 *(26.45)*	5833 *(25.95)*	2.28 *(3.67)*	2647	14.89	4th (II-1) Gear			187 *(85.8)*	70 *(21.1)*	74 *(23.3)*	28.730 *(97.017)*
39.69 *(29.60)*	2531 *(11.26)*	5.88 *(9.46)*	2598	4.34	8th (III-1) Gear			189 *(87.2)*	52 *(16.7)*	67 *(19.4)*	28.970 *(97.827)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 16.9-28; 6; 16 *(110)*	Two 16.9-28; 6; 16 *(110)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	445 lb *(202 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 9.5-24; 6; 20 *(140)*	Two 9.5-24; 6; 20 *(140)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	30 lb *(13 kg)*	None
Height of Drawbar		18.5 in *(470 mm)*	18.5 in *(470 mm)*
Static Weight with Operator	—Rear	4485 lb *(2034 kg)*	3595 lb *(1631 kg)*
	—Front	2185 lb *(991 kg)*	2125 lb *(964 kg)*
	—Total	6670 lb *(3025 kg)*	5720 lb *(2595 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 157°F *(69.5°C)*. Seven gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1484.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Hesston 466 DT Fiat Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1485—HESSTON 666 DT FIAT DIESEL ALSO HESSTON 666, 666 DT/L AND 666/L FIAT MODELS

12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—614 rpm)								
62.40 *(46.53)*	2500	3.894 *(14.740)*	0.437 *(0.266)*	16.03 *(3.157)*	186 *(85.8)*	57 *(13.8)*	75 *(23.9)*	28.853 *(97.430)*
Standard Power Take-off Speed (540 rpm)—One Hour								
60.33 *(44.99)*	2199	3.548 *(13.431)*	0.412 *(0.251)*	17.00 *(3.350)*	186 *(85.7)*	57 *(14.1)*	76 *(24.2)*	28.860 *(97.456)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
57.09 *(42.57)*	2692	3.682 *(13.938)*	0.452 *(0.275)*	15.50 *(3.054)*	183 *(83.9)*	58 *(14.2)*	76 *(24.4)*	....
0.00 *(0.00)*	2906	1.297 *(4.910)*	....	....	171 *(77.2)*	57 *(13.9)*	76 *(24.4)*	....
29.81 *(22.23)*	2808	2.368 *(8.964)*	0.557 *(0.339)*	12.59 *(2.480)*	175 *(79.4)*	57 *(13.9)*	76 *(24.4)*	....
62.68 *(46.74)*	2502	3.896 *(14.748)*	0.436 *(0.265)*	16.09 *(3.169)*	187 *(86.1)*	58 *(14.4)*	78 *(25.6)*	....
15.20 *(11.33)*	2864	1.811 *(6.855)*	0.835 *(0.508)*	8.39 *(1.653)*	172 *(77.8)*	58 *(14.2)*	78 *(25.3)*	....
43.85 *(32.70)*	2758	3.001 *(11.360)*	0.480 *(0.292)*	14.61 *(2.879)*	180 *(81.9)*	57 *(13.9)*	78 *(25.6)*	....
Av 34.77 *Av (25.93)*	**2755**	**2.676** *(10.130)*	**0.539** *(0.328)*	**13.00** *(2.560)*	**178** *(81.1)*	**57** *(14.1)*	**77** *(24.9)*	**28.845** *(97.405)*

DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (III-1) Gear											
53.36 *(39.80)*	3636 *(16.17)*	5.51 *(8.86)*	2500	6.33	3.871 *(14.654)*	0.508 *(0.309)*	13.79 *(2.716)*	189 *(86.9)*	70 *(20.8)*	76 *(24.4)*	28.660 *(96.781)*
75% of Pull at Maximum Power—Ten Hours 8th (III-1) Gear											
44.83 *(33.43)*	2772 *(12.33)*	6.06 *(9.76)*	2706	4.68	3.397 *(12.858)*	0.531 *(0.323)*	13.20 *(2.600)*	185 *(84.7)*	61 *(16.3)*	72 *(22.3)*	28.878 *(97.517)*
50% of Pull at Maximum Power—Two Hours 8th (III-1) Gear											
30.96 *(23.09)*	1848 *(8.22)*	6.28 *(10.11)*	2767	3.44	2.640 *(9.994)*	0.598 *(0.363)*	11.73 *(2.310)*	178 *(81.1)*	63 *(16.9)*	72 *(22.2)*	28.880 *(97.523)*
50% of Pull at Reduced Engine Speed—Two Hours 10th (III-2) Gear											
31.00 *(23.12)*	1849 *(8.22)*	6.29 *(10.12)*	1796	3.33	2.087 *(7.901)*	0.472 *(0.287)*	14.85 *(2.926)*	178 *(81.1)*	65 *(18.3)*	77 *(24.7)*	28.900 *(97.591)*
MAXIMUM POWER IN SELECTED GEARS											
50.33 *(37.53)*	6611 *(29.41)*	2.85 *(4.59)*	2626	14.99	5th (I-4) Gear			182 *(83.3)*	59 *(15.0)*	67 *(19.4)*	28.880 *(97.523)*
52.11 *(38.86)*	5676 *(25.25)*	3.44 *(5.54)*	2501	11.17	6th (II-2) Gear			187 *(86.1)*	68 *(20.0)*	71 *(21.7)*	28.690 *(96.882)*
53.15 *(39.63)*	4575 *(20.35)*	4.36 *(7.01)*	2501	8.32	7th (II-3) Gear			188 *(86.7)*	67 *(19.4)*	71 *(21.7)*	28.700 *(96.916)*
54.31 *(40.50)*	3696 *(16.44)*	5.51 *(8.87)*	2501	6.20	8th (III-1) Gear			188 *(86.7)*	67 *(19.4)*	71 *(21.7)*	28.700 *(96.916)*
53.03 *(39.55)*	2857 *(12.71)*	6.96 *(11.20)*	2499	4.87	9th (II-4) Gear			188 *(86.7)*	68 *(20.0)*	71 *(21.7)*	28.690 *(96.882)*
52.77 *(39.35)*	2271 *(10.10)*	8.71 *(14.02)*	2501	3.85	10th (III-2) Gear			188 *(86.7)*	68 *(20.0)*	71 *(21.7)*	28.690 *(96.882)*

Department of Agricultural Engineering

Dates of Test: June 6-17, 1983

Manufacturer: FIAT TRATTORI S.p.A., Via Pico della Mirandola, 72-41100 Modena, Italy

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8416 **Fuel weight** 7.007 lbs/gal *(0.840 kg/l)* **Oil SAE** 15W-40 **API service classification** SE-SF, CC-CD **To motor** 2.448 gal *(9.268 l)* **Drained from motor** 2.130 gal *(8.062 l)* **Transmission and final drive lubricant** API 303 hydraulic fluid **Total time engine was operated** 39.5 hours.

ENGINE: Make Fiat Diesel **Type** four cylinder vertical **Serial No.** 8045.02*276-137011* **Crankshaft** lengthwise **Rated rpm** 2500 **Bore and stroke** 3.94" × 4.33" *(100 mm × 110 mm)* **Compression ratio** 17 to 1 **Displacement** 211 cu in *(3456 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type front wheel assist **Serial No.** 666DT/12*391026* **Tread width** rear 59.1" *(1500 mm)* to 78.8" *(2000 mm)* front 60.2" *(1530 mm)* to 77" *(1956 mm)* **Wheel base** 88.5" *(2248 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 36.5" *(927 mm)* Vertical distance above roadway 36.5" *(927 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 1.1 *(1.7)* second 1.6 *(2.6)* third 2.0 *(3.2)* fourth 2.4 *(3.9)* fifth 3.1 *(5.0)* sixth 3.8 *(6.0)* seventh 4.6 *(7.4)* eighth 5.7 *(9.2)* ninth 7.1 *(11.4)* tenth 8.8 *(14.1)* eleventh 10.7 *(17.3)* twelfth 16.6 *(26.6)* reverse 2.7 *(4.4)*, 4.2 *(6.7)*, 5.1 *(8.2)*, 7.9 *(12.7)* **Clutch** dry disc operated by foot pedal **Brakes** wet disc operated by two foot pedals which can be locked together and hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 151" *(3.84 m)* left 151" *(3.84 m)* (on concrete surface without brake) right 212" *(5.38 m)* left 212" *(5.38 m)* **Turning space diameter** (on concrete surface with brake applied) right 311" *(7.90 m)* left 311" *(7.90 m)* (on concrete surface without brake) right 433" *(11.00 m)* left 433" *(11.00 m)* **Power take-off** 540 rpm at 2199 engine rpm.

LUGGING ABILITY IN 8th (III-1) GEAR

Crankshaft Speed rpm	2501	2255	1994	1752	1492	1242
Pull—lbs *(kN)*	3696 *(16.44)*	3986 *(17.73)*	4266 *(18.98)*	4365 *(19.42)*	4535 *(20.17)*	4533 *(20.16)*
Increase in Pull %	0	8	15	18	23	23
Power—Hp *(kW)*	54.31 *(40.50)*	52.45 *(39.11)*	49.34 *(36.79)*	44.24 *(32.99)*	38.97 *(29.06)*	32.42 *(24.18)*
Speed—Mph *(km/h)*	5.51 *(8.87)*	4.93 *(7.94)*	4.34 *(6.98)*	3.80 *(6.12)*	3.22 *(5.19)*	2.68 *(4.32)*
Slip %	6.20	6.85	7.49	7.62	8.00	8.13

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB (A)
Maximum Available Power—Two Hours	94.5	93.5
75% of Pull at Maximum Power—Ten Hours		95.0
50% of Pull at Maximum Power—Two Hours		94.5
50% of Pull at Reduced Engine Speed—Two Hours		90.5
Bystander in 12th (III-4) gear		85.5

DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (III-1) Gear											
53.13 *(39.62)*	3542 *(15.75)*	5.63 *(9.05)*	2500	5.45	3.889 *(14.721)*	0.513 *(0.312)*	13.66 *(2.691)*	190 *(87.5)*	70 *(20.8)*	75 *(23.6)*	28.625 *(96.662)*
MAXIMUM POWER IN SELECTED GEARS											
46.24 *(34.48)*	7433 *(33.06)*	2.33 *(3.75)*	2690	14.84	4th (II-1) Gear			178 *(80.8)*	58 *(14.4)*	62 *(16.7)*	28.870 *(97.490)*
54.15 *(40.38)*	3606 *(16.04)*	5.63 *(9.06)*	2504	5.62	8th (III-1) Gear			188 *(86.7)*	66 *(18.9)*	70 *(21.1)*	28.700 *(96.916)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-30; 6; 16 *(110)*	Two 18.4-30; 6; 16 *(110)*
Ballast	—Liquid (each)	752 lb *(332 kg)*	None
	—Cast Iron (each)	445 lb *(202 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 12.4-24; 6; 24 *(165)*	Two 12.4-24; 6; 24 *(165)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	35 lb *(16 kg)*	None
Height of Drawbar		22 in *(560 mm)*	22 in *(560 mm)*
Static Weight with Operator	—Rear	6125 lb *(2778 kg)*	3770 lb *(1710 kg)*
	—Front	2590 lb *(1175 kg)*	2520 lb *(1143 kg)*
	—Total	8715 lb *(3953 kg)*	6290 lb *(2853 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 151°F *(65.8°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1485.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Hesston 666 DT Fiat Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1486
WHITE FARM EQUIPMENT-ISEKI 2-75 DIESEL
16 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—1074 rpm)								
75.39 *(56.22)*	2200	4.903 *(18.560)*	0.456 *(0.277)*	15.38 *(3.029)*	186 *(85.8)*	70 *(21.4)*	75 *(23.8)*	29.000 *(97.929)*
Standard Power Take-off Speed (1000 rpm)—One Hour								
75.64 *(56.40)*	2050	4.769 *(18.053)*	0.442 *(0.269)*	15.86 *(3.124)*	186 *(85.6)*	70 *(21.3)*	75 *(24.1)*	29.005 *(97.946)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
66.60 *(49.66)*	2288	4.558 *(17.254)*	0.480 *(0.292)*	14.61 *(2.878)*	186 *(85.6)*	70 *(21.4)*	77 *(25.0)*	…… ……
0.00 *(0.00)*	2389	1.643 *(6.219)*	… ……	…… ……	184 *(84.7)*	70 *(21.4)*	76 *(24.4)*	…… ……
33.86 *(25.25)*	2326	3.000 *(11.356)*	0.621 *(0.378)*	11.29 *(2.223)*	186 *(85.6)*	70 *(21.4)*	76 *(24.4)*	…… ……
75.11 *(56.01)*	2200	4.887 *(18.499)*	0.456 *(0.278)*	15.37 *(3.028)*	187 *(86.1)*	71 *(21.7)*	78 *(25.6)*	…… ……
17.12 *(12.77)*	2350	2.345 *(8.877)*	0.960 *(0.584)*	7.30 *(1.439)*	184 *(84.4)*	71 *(21.7)*	77 *(25.0)*	…… ……
50.34 *(37.54)*	2304	3.779 *(14.305)*	0.526 *(0.320)*	13.32 *(2.624)*	186 *(85.6)*	72 *(22.2)*	80 *(26.4)*	…… ……
Av 40.51 *Av* *(30.21)*	2310	3.369 *(12.753)*	0.583 *(0.355)*	12.02 *(2.369)*	186 *(85.3)*	71 *(21.6)*	77 *(25.2)*	29.005 *(97.946)*

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 13th (HL4) Gear											
63.58 *(47.41)*	3958 *(17.60)*	6.02 *(9.70)*	2198	7.43	4.886 *(18.495)*	0.539 *(0.328)*	13.01 *(2.563)*	190 *(87.8)*	74 *(23.3)*	81 *(27.2)*	28.990 *(97.895)*
75% of Pull at Maximum Power—Ten Hours 13th (HL4) Gear											
52.18 *(38.91)*	3032 *(13.49)*	6.45 *(10.39)*	2302	5.28	4.272 *(16.173)*	0.574 *(0.349)*	12.21 *(2.406)*	191 *(88.1)*	74 *(23.3)*	87 *(30.7)*	28.922 *(97.665)*
50% of Pull at Maximum Power—Two Hours 13th (HL4) Gear											
35.69 *(26.61)*	2021 *(8.99)*	6.62 *(10.66)*	2324	3.68	3.406 *(12.893)*	0.669 *(0.407)*	10.48 *(2.064)*	190 *(87.8)*	71 *(21.4)*	75 *(23.9)*	28.830 *(97.355)*
50% of Pull at Reduced Engine Speed—Two Hours 15th (HH3) Gear											
35.75 *(26.66)*	2022 *(8.99)*	6.63 *(10.67)*	1498	3.47	2.586 *(9.788)*	0.507 *(0.308)*	13.82 *(2.723)*	188 *(86.4)*	74 *(23.3)*	81 *(27.2)*	28.875 *(97.507)*
MAXIMUM POWER IN SELECTED GEARS											
55.85 *(41.65)*	6487 *(28.86)*	3.23 *(5.20)*	2287	14.95	10th (HL2) Gear			190 *(87.8)*	70 *(21.1)*	74 *(23.3)*	28.850 *(97.422)*
62.13 *(46.33)*	6163 *(27.41)*	3.78 *(6.08)*	2200	13.34	11th (HL3) Gear			190 *(87.8)*	69 *(20.6)*	73 *(22.8)*	28.840 *(97.388)*
63.39 *(47.27)*	5376 *(23.91)*	4.42 *(7.12)*	2200	11.32	12th (HH1) Gear			190 *(87.8)*	73 *(22.8)*	79 *(26.1)*	28.960 *(97.794)*
65.05 *(48.51)*	4042 *(17.98)*	6.04 *(9.71)*	2199	7.30	13th (HL4) Gear			190 *(87.8)*	75 *(23.9)*	78 *(25.6)*	28.950 *(97.760)*
64.96 *(48.44)*	3050 *(13.57)*	7.99 *(12.85)*	2200	5.52	14th (HH2) Gear			190 *(87.8)*	73 *(22.8)*	78 *(25.6)*	28.960 *(97.794)*
64.28 *(47.93)*	2501 *(11.13)*	9.64 *(15.51)*	2198	4.44	15th (HH3) Gear			190 *(87.8)*	69 *(20.6)*	73 *(22.8)*	28.830 *(97.355)*

Department of Agricultural Engineering

Dates of Test: August 22 to September 1, 1983

Manufacturer: ISEKI AND COMPANY, LTD.,
2-6 Kioicho Chiyoda-Ku Tokyo, Japan 102

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8419 **Fuel weight** 7.010 lbs/gal *(0.840 kg/l)* **Oil** White Farm Equipment Company Supreme Blend **SAE** 30 **API service classification** CC-CD, SD-SF **To motor** 3.575 gal *(13.531 l)* **Drained from motor** 3.311 gal *(12.534 l)* **Transmission and final drive lubricant** White Farm Equipment Company Universal fluid **Total time engine was operated** 38.0 hours.

ENGINE: **Make** Isuzu Diesel **Model** 6BB1 **Type** six cylinder vertical **Serial No.** 520592 **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 4.016" × 4.33" *(102 mm × 110 mm)* **Compression ratio** 17.5 to 1 **Displacement** 329 cu in *(5393 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow element **Oil cooler** engine coolant heat exchanger for crankcase oil **Fuel filter** two paper elements with sediment bowl and screen **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** front wheel assist **Serial No.** 00288 M **Tread width** rear 59.0" *(1500 mm)* to 79.1" *(2010 mm)* front 61.4" *(1560 mm)* **Wheel base** 92.1" *(2340 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 34.8" *(885 mm)* Vertical distance above roadway 30.9" *(784 mm)* Horizontal distance from center of rear wheel tread 0.1" *(3 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 0.4 *(0.7)* second 0.7 *(1.1)* third 0.8 *(1.3)* fourth 0.9 *(1.5)* fifth 1.2 *(2.0)* sixth 1.6 *(2.6)* seventh 1.9 *(3.1)* eighth 2.2 *(3.5)* ninth 2.8 *(4.5)* tenth 3.7 *(5.9)* eleventh 4.4 *(7.1)* twelfth 5.0 *(8.0)* thirteenth 6.5 *(10.5)* fourteenth 8.4 *(13.5)* fifteenth 10.1 *(16.2)* sixteenth 14.9 *(24.0)* reverse 0.5 *(0.8)*, 1.2 *(2.0)*, 2.6 *(4.2)*, 6.5 *(10.5)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc operated by two foot pedals which can be locked together and hand lever **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 135" *(3.43 m)* left 135" *(3.43 m)* (on concrete surface without brake) right 188" *(4.78 m)* left 188" *(4.78 m)* **Turning space diameter** (on concrete surface with brake applied) right 280" *(7.11 m)* left 280" *(7.11 m)* (on concrete surface without brake) right 386" *(9.80 m)* left 386" *(9.80 m)* **Power take-off** 540 rpm at 1813 engine rpm and 1000 rpm at 2050 engine rpm.

LUGGING ABILITY IN 13th (HL4) GEAR

Crankshaft Speed rpm	2199	1980	1755	1540	1313	1095
Pull—lbs *(kN)*	4042 *(17.98)*	4478 *(19.92)*	4861 *(21.62)*	5084 *(22.61)*	5018 *(22.32)*	4947 *(22.01)*
Increase in Pull %	0	11	20	26	24	22
Power—Hp *(kW)*	65.05 *(48.51)*	64.22 *(47.89)*	61.07 *(45.54)*	55.59 *(41.45)*	46.80 *(34.90)*	38.52 *(28.73)*
Speed—Mph *(km/h)*	6.04 *(9.71)*	5.38 *(8.65)*	4.71 *(7.58)*	4.10 *(6.60)*	3.50 *(5.63)*	2.92 *(4.70)*
Slip %	7.30	8.26	9.38	10.12	10.00	9.88

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	94.5	94.5
75% of Pull at Maximum Power—Ten Hours		95.0
50% of Pull at Maximum Power—Two Hours		95.0
50% of Pull at Reduced Engine Speed—Two Hours		92.0
Bystander in 16th (HH4) gear		84.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 13th (HL4) Gear											
64.07 *(47.78)*	3863 *(17.18)*	6.22 *(10.01)*	2199	5.28	4.904 *(18.563)*	0.536 *(0.326)*	13.07 *(2.574)*	191 *(88.1)*	75 *(23.6)*	83 *(28.1)*	28.995 *(97.912)*
MAXIMUM POWER IN SELECTED GEARS											
54.43 *(40.59)*	8028 *(35.71)*	2.54 *(4.09)*	2294	14.85	9th (LH4) Gear			191 *(88.1)*	70 *(21.1)*	75 *(23.9)*	28.860 *(97.456)*
64.79 *(48.32)*	3907 *(17.38)*	6.22 *(10.01)*	2200	5.42	13th (HL4) Gear			189 *(87.2)*	75 *(23.9)*	79 *(26.1)*	28.950 *(97.760)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 16.9-34; 6; 16 *(110)*	Two 16.9-34; 6; 16 *(110)*
Ballast	—Liquid (each)	473 lb *(214 kg)*	None
	—Cast Iron (each)	350 lb *(159 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 11.2-24; 6; 20 *(140)*	Two 11.2-24; 6; 20 *(140)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	30 lb *(14 kg)*	None
Height of Drawbar		19 in *(485 mm)*	19 in *(485 mm)*
Static Weight with Operator	—Rear	6625 lb *(3005 kg)*	4980 lb *(2259 kg)*
	—Front	3000 lb *(1361 kg)*	2940 lb *(1334 kg)*
	—Total	9625 lb *(4366 kg)*	7920 lb *(3593 kg)*

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 150°F *(65.6°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1486.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

White Farm Equipment-Iseki 2-75 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1487—WHITE FARM EQUIPMENT 2-88 DIESEL 18 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—1097 rpm)									
	86.78	2200	5.524	0.446	15.71	185	70	75	28.943
	(64.71)		*(20.911)*	*(0.271)*	*(3.095)*	*(84.9)*	*(21.1)*	*(23.8)*	*(97.737)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
	75.85	2262	4.930	0.456	15.38	182	70	76	......
	(56.55)		*(18.662)*	*(0.277)*	*(3.030)*	*(83.6)*	*(21.1)*	*(24.2)*	......
	0.00	2362	1.755	.....	.....	172	70	74	......
	(0.00)		*(6.643)*	.....	.....	*(78.1)*	*(20.8)*	*(23.6)*	......
	38.81	2304	3.218	0.584	12.00	176	69	75	......
	(28.79)		*(12.181)*	*(0.355)*	*(2.364)*	*(79.7)*	*(20.6)*	*(23.9)*	......
	87.61	2200	5.568	0.446	15.74	185	68	74	......
	(65.33)		*(21.077)*	*(0.271)*	*(3.100)*	*(85.0)*	*(20.3)*	*(23.6)*	......
	19.59	2339	2.495	0.893	7.85	174	69	75	......
	(14.61)		*(9.445)*	*(0.543)*	*(1.547)*	*(78.6)*	*(20.6)*	*(23.9)*	......
	57.08	2270	3.997	0.491	14.28	177	69	76	......
	(42.56)		*(15.130)*	*(0.299)*	*(2.813)*	*(80.6)*	*(20.6)*	*(24.2)*	......
Av	**46.45**	**2290**	**3.660**	**0.552**	**12.69**	**178**	**69**	**75**	**28.963**
Av	***(34.64)***		***(13.855)***	***(0.336)***	***(2.500)***	***(80.9)***	***(20.7)***	***(23.9)***	***(97.805)***

DRAWBAR PERFORMANCE (Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 11th (4D) Gear											
73.81	4253	6.51	2200	4.16	5.421	0.515	13.62	187	73	84	29.030
(55.04)	*(18.92)*	*(10.48)*			*(20.520)*	*(0.313)*	*(2.682)*	*(86.1)*	*(22.5)*	*(28.6)*	*(98.030)*
75% of Pull at Maximum Power—Ten Hours 11th (4D) Gear											
58.81	3228	6.83	2281	3.14	4.615	0.550	12.74	184	71	85	28.987
(43.85)	*(14.36)*	*(10.99)*			*(17.469)*	*(0.335)*	*(2.510)*	*(84.2)*	*(21.8)*	*(29.4)*	*(97.885)*
50% of Pull at Maximum Power—Two Hours 11th (4D) Gear											
40.22	2153	7.01	2318	2.16	3.727	0.650	10.79	180	68	82	28.915
(29.99)	*(9.57)*	*(11.28)*			*(14.108)*	*(0.395)*	*(2.126)*	*(81.9)*	*(19.7)*	*(27.5)*	*(97.642)*
50% of Pull at Reduced Engine Speed—Two Hours 15th (5O) Gear											
40.21	2152	7.01	1383	2.21	2.996	0.522	13.42	186	71	92	28.905
(29.98)	*(9.57)*	*(11.28)*			*(11.340)*	*(0.318)*	*(2.644)*	*(85.6)*	*(21.4)*	*(33.1)*	*(97.608)*
MAXIMUM POWER IN SELECTED GEARS											
54.58	9486	2.16	2272	14.60	3rd (1O) Gear			180	64	73	28.910
(40.70)	*(42.20)*	*(3.47)*						*(82.2)*	*(17.8)*	*(22.8)*	*(97.625)*
69.26	9192	2.83	2200	13.48	4th (2U) Gear			183	65	75	28.910
(51.64)	*(40.89)*	*(4.55)*						*(83.9)*	*(18.3)*	*(23.9)*	*(97.625)*
72.93	7665	3.57	2199	9.22	5th (2D) Gear			185	72	78	29.030
(54.38)	*(34.10)*	*(5.74)*						*(85.0)*	*(22.2)*	*(25.6)*	*(98.030)*
71.75	7179	3.75	2200	8.26	6th (3U) Gear			184	71	77	29.030
(53.50)	*(31.93)*	*(6.03)*						*(84.2)*	*(21.7)*	*(25.0)*	*(98.030)*
73.11	6246	4.39	2199	6.97	7th (2O) Gear			184	71	76	29.020
(54.52)	*(27.78)*	*(7.06)*						*(84.4)*	*(21.7)*	*(24.4)*	*(97.996)*
73.37	5977	4.60	2199	6.35	8th (3D) Gear			183	71	75	29.020
(54.71)	*(26.58)*	*(7.41)*						*(83.6)*	*(21.7)*	*(23.9)*	*(97.996)*
73.69	5177	5.34	2199	5.41	9th (4U) Gear			183	71	74	29.020
(54.95)	*(23.03)*	*(8.59)*						*(83.6)*	*(21.7)*	*(23.3)*	*(97.996)*
72.61	4855	5.61	2199	5.01	10th (3O) Gear			183	70	73	29.020
(54.15)	*(21.60)*	*(9.03)*						*(83.9)*	*(21.1)*	*(22.8)*	*(97.996)*
74.67	4304	6.51	2200	4.37	11th (4D) Gear			183	68	71	29.010
(55.68)	*(19.14)*	*(10.47)*						*(83.6)*	*(20.0)*	*(21.7)*	*(97.962)*
72.60	3584	7.60	2199	3.63	12th (5U) Gear			185	72	79	29.030
(54.14)	*(15.94)*	*(12.23)*						*(85.0)*	*(22.2)*	*(26.1)*	*(98.030)*
73.08	3479	7.88	2200	3.38	13th (4O) Gear			185	72	79	29.040
(54.49)	*(15.47)*	*(12.68)*						*(84.7)*	*(22.2)*	*(26.1)*	*(98.064)*
72.74	2961	9.21	2199	2.71	14th (5D) Gear			186	72	80	29.040
(54.25)	*(13.17)*	*(14.83)*						*(85.3)*	*(22.2)*	*(26.7)*	*(98.064)*

Department of Agricultural Engineering

Dates of Test: August 22 to September 7, 1983

Manufacturer: WHITE FARM EQUIPMENT COMPANY, 2625 Butterfield Road, Oak Brook, Illinois 60521

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8419 **Fuel weight** 7.010 lbs/gal *(0.840 kg/l)* **Oil** White Farm Equipment Company Supreme Blend **SAE** 30 **API service classification** CC-CD, SD-SF **To motor** 3.921 gal *(14.843 l)* **Drained from motor** 3.170 gal *(11.999 l)* **Transmission and final drive lubricant** White Farm Equipment Company Universal fluid **Front axle lubricant** SAE 80-90 multi-purpose gear lubricant **Total time engine was operated** 75.0 hours.

ENGINE: **Make** Perkins Diesel **Type** six cylinder vertical **Serial No.** TW70008U654266H **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 3.875" × 5.00" *(98.4 mm × 127 mm)* **Compression ratio** 16 to 1 **Displacement** 354 cu in *(5802 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements with aspirator **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and hydraul shift oil **Fuel filter** two paper elements and water separator **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: **Type** front wheel assist **Serial No.** 301650-441 **Tread width** rear 63" *(1600 mm)* to 111" *(2820 mm)* front 66" *(1676 mm)* to 80" *(2032 mm)* **Wheel base** 86.3" *(2191 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 34.9" *(886 mm)* Vertical distance above roadway 42.0" *(1067 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (3) range operator controlled powershift **Advertised speeds mph** *(km/h)* first 1.6 *(2.6)* second 2.0 *(3.2)* third 2.3 *(3.7)* fourth 3.1 *(5.0)* fifth 3.8 *(6.1)* sixth 3.9 *(6.3)* seventh 4.5 *(7.2)* eighth 4.7 *(7.6)* ninth 5.4 *(8.7)* tenth 5.7 *(9.2)* eleventh 6.5 *(10.5)* twelfth 7.6 *(12.2)* thirteenth 7.8 *(12.6)* fourteenth 9.1 *(14.6)* fifteenth 10.9 *(17.5)* sixteenth 13.1 *(21.1)* seventeenth 15.7 *(25.3)* eighteenth 18.9 *(30.4)* reverse 1.8 *(2.9)*, 2.2 *(3.5)*, 2.6 *(4.2)*, 4.4 *(7.1)*, 5.3 *(8.5)*, 6.4 *(10.3)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple dry disc hydraulically power actuated and operated by two foot pedals which can be locked together and mechanically by hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 195" *(4.95 m)* left 195" *(4.95 m)* (on concrete surface without brake) right 233" *(5.92 m)* left 233" *(5.92 m)* **Turning space diameter** (on concrete surface with brake applied) right 406" *(10.31 m)* left 406" *(10.31 m)* (on concrete surface without brake) right 482" *(12.24 m)* left 482" *(12.24 m)* **Power take-off** 540 rpm at 2192 engine rpm and 1007 rpm at 2200 engine rpm.

LUGGING ABILITY IN 11th (4D) GEAR

Crankshaft Speed rpm	2200	1982	1757	1539	1310	1094
Pull—lbs	4304	4614	4756	4837	4934	4923
(kN)	*(19.14)*	*(20.52)*	*(21.16)*	*(21.52)*	*(21.95)*	*(21.90)*
Increase in Pull %	0	7	11	12	15	14
Power—Hp	74.67	71.87	65.50	58.31	50.57	42.09
(kW)	*(55.68)*	*(53.60)*	*(48.84)*	*(43.48)*	*(37.71)*	*(31.39)*
Speed—Mph	6.51	5.84	5.16	4.52	3.84	3.21
(km/h)	*(10.47)*	*(9.40)*	*(8.31)*	*(7.27)*	*(6.19)*	*(5.16)*
Slip %	4.37	4.61	4.93	5.09	5.25	5.25

TRACTOR SOUND LEVEL WITH CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	75.0	75.5
75% of Pull at Maximum Power—Ten Hours		75.5
50% of Pull at Maximum Power—Two Hours		74.0
50% of Pull at Reduced Engine Speed—Two Hours		73.5
Bystander in 17th (6D) gear		88.0

DRAWBAR PERFORMANCE (Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 11th (4D) Gear											
73.38	4121	6.68	2200	2.72	5.421	0.518	13.54	189	72	88	29.015
(54.72)	*(18.33)*	*(10.75)*			*(20.520)*	*(0.315)*	*(2.667)*	*(86.9)*	*(22.2)*	*(30.8)*	*(97.979)*
MAXIMUM POWER IN SELECTED GEARS											
60.50	12632	1.80	2254	14.93	2nd (1D) Gear			180	63	70	28.910
(45.12)	*(56.19)*	*(2.89)*						*(82.2)*	*(17.2)*	*(21.1)*	*(97.625)*
74.11	4167	6.67	2201	2.77	11th (4D) Gear			182	67	69	29.000
(55.26)	*(18.53)*	*(10.73)*						*(83.3)*	*(19.4)*	*(20.6)*	*(97.929)*

TIRES, BALLAST AND WEIGHT		**Tested Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 20.8-38, 8; 16 *(110)*
Ballast	—Liquid (each)	None
	—Cast Iron (each)	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 16.9-26; 8; 16 *(110)*
Ballast	—Liquid (each)	None
	—Cast Iron (each)	None
Height of Drawbar		21 in *(535 mm)*
Static Weight with Operator	—Rear	8115 lb *(3681 kg)*
	—Front	5500 lb *(2495 kg)*
	—Total	13615 lb *(6176 kg)*

White Farm Equipment 2-88 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

REPAIRS and ADJUSTMENTS: During the 2 HR maximum drawbar test, if was found that the horsepower increased due to an injection pump setting change. All tests were rerun after pump was readjusted.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 157°F *(69.5°C)*. Twelve gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1487**.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

NEBRASKA TRACTOR TEST 1491—FORD 2910 (8x2) DIESEL
8 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—600 rpm)								
36.62 *(27.31)*	2000	2.332 *(8.828)*	0.446 *(0.271)*	15.71 *(3.094)*	188 *(86.6)*	58 *(14.4)*	75 *(24.0)*	29.220 *(98.672)*
Standard Power Take-off Speed (540 rpm)—One Hour								
35.09 *(26.17)*	1800	2.187 *(8.279)*	0.436 *(0.265)*	16.04 *(3.161)*	188 *(86.7)*	57 *(13.9)*	75 *(23.9)*	29.250 *(98.773)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
31.69 *(23.63)*	2035	2.079 *(7.870)*	0.459 *(0.279)*	15.24 *(3.003)*	184 *(84.7)*	56 *(13.3)*	74 *(23.3)*	......
0.00 *(0.00)*	2126	0.767 *(2.903)*	.....	.....	150 *(65.6)*	56 *(13.3)*	74 *(23.1)*	......
16.22 *(12.10)*	2084	1.389 *(5.258)*	0.599 *(0.365)*	11.68 *(2.301)*	157 *(69.4)*	56 *(13.6)*	75 *(23.9)*	......
36.83 *(27.46)*	1999	2.340 *(8.858)*	0.445 *(0.271)*	15.74 *(3.10C)*	188 *(86.9)*	57 *(13.9)*	76 *(24.4)*	......
8.19 *(6.11)*	2106	1.054 *(3.990)*	0.901 *(0.548)*	7.77 *(1.531)*	152 *(66.9)*	56 *(13.3)*	74 *(23.3)*	......
24.04 *(17.93)*	2060	1.723 *(6.522)*	0.502 *(0.305)*	13.95 *(2.749)*	170 *(76.4)*	56 *(13.6)*	76 *(24.2)*	......
Av 19.30 **Av *(14.34)***	**2068**	**1.559** ***(5.901)***	**0.559** ***(0.340)***	**12.51** ***(2.464)***	**167** ***(75.0)***	**56** ***(13.5)***	**75** ***(23.7)***	**29.240** ***(98.739)***

DRAWBAR PERFORMANCE

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 5th Gear											
29.09 *(21.69)*	1886 *(8.39)*	5.78 *(9.31)*	2000	5.09	2.207 *(8.356)*	0.531 *(0.323)*	13.18 *(2.596)*	191 *(88.3)*	66 *(18.6)*	78 *(25.6)*	29.085 *(98.216)*
75% of Pull at Maximum Power—Ten Hours 5th Gear											
23.71 *(17.68)*	1485 *(6.61)*	5.99 *(9.64)*	2041	3.72	1.926 *(7.291)*	0.569 *(0.346)*	12.31 *(2.425)*	187 *(86.1)*	66 *(19.1)*	80 *(26.7)*	28.952 *(97.767)*
50% of Pull at Maximum Power—Two Hours 5th Gear											
16.19 *(12.07)*	990 *(4.40)*	6.13 *(9.87)*	2066	2.60	1.543 *(5.841)*	0.667 *(0.406)*	10.49 *(2.067)*	182 *(83.1)*	66 *(18.6)*	86 *(30.0)*	29.060 *(98.131)*
50% of Pull at Reduced Engine Speed—Two Hours 6th Gear											
16.22 *(12.09)*	990 *(4.40)*	6.14 *(9.89)*	1655	2.34	1.357 *(5.138)*	0.586 *(0.356)*	11.95 *(2.354)*	186 *(85.3)*	65 *(18.3)*	89 *(31.4)*	29.015 *(97.979)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %				Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
21.00 *(15.66)*	4237 *(18.85)*	1.86 *(2.99)*	2049	14.78		2nd Gear		163 *(72.5)*	55 *(12.8)*	57 *(13.9)*	29.060 *(98.131)*
29.07 *(21.68)*	3208 *(14.27)*	3.40 *(5.47)*	2000	8.98		3rd Gear		187 *(86.1)*	56 *(13.3)*	59 *(15.0)*	29.070 *(98.165)*
29.62 *(22.09)*	2333 *(10.38)*	4.76 *(7.66)*	1999	6.24		4th Gear		187 *(86.1)*	58 *(14.4)*	62 *(16.7)*	29.080 *(98.199)*
30.45 *(22.71)*	1980 *(8.81)*	5.77 *(9.28)*	1997	5.25		5th Gear		189 *(87.2)*	62 *(16.7)*	71 *(21.7)*	29.100 *(98.266)*
29.75 *(22.19)*	1533 *(6.82)*	7.28 *(11.72)*	1997	4.13		6th Gear		188 *(86.7)*	59 *(15.0)*	65 *(18.3)*	29.090 *(98.233)*

LUGGING ABILITY IN 5th GEAR

Crankshaft Speed rpm	1997	1800	1606	1395	1194	994
Pull—lbs *(kN)*	1980 *(8.81)*	2136 *(9.50)*	2248 *(10.00)*	2321 *(10.32)*	2343 *(10.42)*	2336 *(10.39)*
Increase in Pull %	0	8	14	17	18	18
Power—Hp *(kW)*	30.45 *(22.71)*	29.47 *(21.98)*	27.58 *(20.57)*	24.68 *(18.40)*	21.31 *(15.89)*	17.67 *(13.18)*
Speed—Mph *(km/h)*	5.77 *(9.28)*	5.17 *(8.33)*	4.60 *(7.40)*	3.99 *(6.42)*	3.41 *(5.49)*	2.84 *(4.57)*
Slip %	5.25	5.39	6.02	6.13	6.15	6.24

Department of Agricultural Engineering

Dates of Test: September 14-28, 1983

Manufacturer: FORD MOTOR COMPANY, Ford Tractor Operations, 2500 East Maple Road, Troy, Michigan 48084

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8406 **Fuel weight** 6.999 lbs/gal *(0.839 kg/l)* **Oil SAE 30** **API service classification** SE-SF, CC-CD **To motor** 1.411 gal *(5.341 l)* **Drained from motor** 1.271 gal *(4.810 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 38.0 hours.

ENGINE: **Make** Ford Diesel **Type** three cylinder vertical **Serial No.** *B698152* **Crankshaft** lengthwise **Rated rpm** 2000 **Bore and stroke** 4.2" × 4.2" *(106.7 mm × 106.7 mm)* **Compression ratio** 17.3 to 1 **Displacement** 175 cu in *(2868 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** *C699558* **Tread width** rear 56" *(1422 mm)* to 80" *(2032 mm)* front 52" *(1320 mm)* to 80" *(2032 mm)* **Wheel base** 77.5" *(1969 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 28.5" *(724 mm)* Vertical distance above roadway 28.1" *(715 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 1.7 *(2.8)* second 2.2 *(3.5)* third 3.8 *(6.1)* fourth 5.1 *(8.3)* fifth 6.2 *(9.9)* sixth 7.7 *(12.3)* seventh 13.5 *(21.7)* eighth 18.3 *(29.5)* reverse 2.5 *(4.0)*, 8.8 *(14.2)* **Clutch** single plate dry disc operated by foot pedal **Brakes** wet multiple disc operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 114" *(2.89 m)* left 114" *(2.89 m)* (on concrete surface without brake) right 136" *(3.45 m)* left 136" *(3.45 m)* **Turning space diameter** (on concrete surface with brake applied) right 233" *(5.92 m)* left 233" *(5.92 m)* (on concrete surface without brake) right 275" *(6.98 m)* left 275" *(6.98 m)* **Power take-off** 540 rpm at 1800 engine rpm.

REPAIRS and ADJUSTMENTS: The fuel injectors were replaced during preliminary PTO tests.

TRACTOR SOUND LEVEL WITHOUT CAB	**dB(A)**
Maximum Available Power—Two Hours	96.0
75% of Pull at Maximum Power—Ten Hours	95.5
50% of Pull at Maximum Power—Two Hours	93.5
50% of Pull at Reduced Engine Speed—Two Hours	92.0
Bystander in 8th gear	85.0

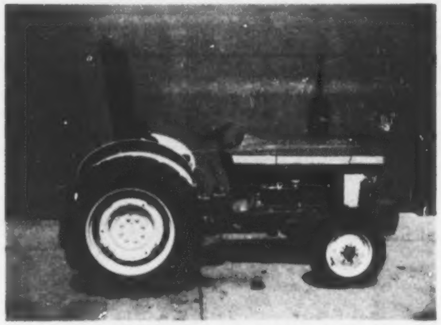
TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 13.6-28; 4; 14 *(95)*	Two 13.6-28; 4; 14 *(95)*
Ballast	—Liquid (each)	470 lb. *(213 kg)*	None
	—Cast Iron (each)	133 lb *(60 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 6.00-16; 4; 36 *(250)*	Two 6.00-16; 4; 36 *(250)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	45 lb *(21 kg)*	None
Height of Drawbar		16.5 in *(420 mm)*	16.5 in *(420 mm)*
Static Weight with Operator	—Rear	4150 lb *(1882 kg)*	2945 lb *(1336 kg)*
	—Front	1775 lb *(805 kg)*	1685 lb *(764 kg)*
	—Total	5925 lb *(2687 kg)*	4630 lb *(2100 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 139°F *(59.4°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. During inspection the exhaust valve seats were found to be pitted.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1491.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Ford 2910 (8x2) Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1492—FORD 2910 (8x4) DIESEL 8 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—600 rpm)									
	36.40 (27.14)	2000	2.336 (8.843)	0.449 (0.273)	15.58 (3.069)	190 (87.7)	68 (19.9)	75 (23.8)	28.767 (97.141)
Standard Power Take-off Speed (540 rpm)—One Hour									
	34.75 (25.91)	1799	2.179 (8.248)	0.439 (0.267)	15.95 (3.141)	190 (87.8)	69 (20.3)	75 (24.1)	28.765 (97.135)
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
	31.84 (23.74)	2058	2.105 (7.968)	0.463 (0.281)	15.13 (2.979)	186 (85.6)	68 (20.0)	76 (24.4)	....
	0.00 (0.00)	2146	0.763 (2.888)	....	....	181 (82.8)	67 (19.4)	75 (23.9)	....
	16.31 (12.16)	2109	1.393 (5.273)	0.598 (0.364)	11.71 (2.306)	184 (84.2)	67 (19.4)	75 (23.9)	....
	36.66 (27.34)	2000	2.336 (8.843)	0.446 (0.271)	15.69 (3.092)	190 (87.5)	67 (19.4)	76 (24.2)	....
	8.26 (6.16)	2132	1.067 (4.039)	0.905 (0.550)	7.74 (1.525)	180 (82.2)	66 (19.2)	76 (24.4)	....
	24.26 (18.09)	2092	1.663 (6.295)	0.480 (0.292)	14.59 (2.874)	185 (85.0)	65 (18.3)	76 (24.4)	....
Av *Av*	**19.56** **(14.59)**	**2089**	**1.555** **(5.886)**	**0.556** **(0.338)**	**12.58** **(2.479)**	**184** **(84.6)**	**67** **(19.3)**	**76** **(24.2)**	**28.755** **(97.101)**

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 5th Gear											
30.10 (22.44)	1977 (8.79)	5.71 (9.19)	2001	5.06	2.315 (8.762)	0.538 (0.327)	13.00 (2.562)	193 (89.4)	62 (16.7)	78 (25.3)	28.870 (97.490)
75% of Pull at Maximum Power—Ten Hours 5th Gear											
24.62 (18.36)	1537 (6.84)	6.01 (9.67)	2079	3.83	2.012 (7.615)	0.572 (0.348)	12.24 (2.411)	191 (88.4)	71 (21.4)	82 (28.0)	28.560 (96.443)
50% of Pull at Maximum Power—Two Hours 5th Gear											
16.87 (12.58)	1025 (4.56)	6.17 (9.93)	2112	2.75	1.593 (6.030)	0.661 (0.402)	10.59 (2.087)	186 (85.6)	60 (15.3)	75 (23.9)	28.875 (97.507)
50% of Pull at Reduced Engine Speed—Two Hours 6th Gear											
16.86 (12.57)	1025 (4.56)	6.17 (9.93)	1448	2.60	1.293 (4.895)	0.537 (0.327)	13.04 (2.569)	186 (85.3)	60 (15.3)	75 (23.6)	28.825 (97.338)
MAXIMUM POWER IN SELECTED GEARS											
24.59 (18.34)	4223 (18.78)	2.18 (3.51)	2072	14.84		2nd Gear		187 (86.1)	53 (11.7)	60 (15.6)	28.960 (97.794)
29.96 (22.34)	3448 (15.34)	3.26 (5.24)	2002	10.11		3rd Gear		189 (87.2)	54 (12.2)	61 (16.1)	28.960 (97.794)
30.06 (22.42)	2280 (10.14)	4.94 (7.96)	2000	6.08		4th Gear		189 (87.2)	55 (12.8)	63 (17.2)	28.960 (97.794)
31.03 (23.14)	2049 (9.11)	5.68 (9.14)	1999	5.48		5th Gear		189 (87.2)	56 (13.3)	65 (18.3)	28.960 (97.794)
29.94 (22.33)	1332 (5.93)	8.43 (13.57)	2001	3.68		6th Gear		189 (87.2)	54 (12.2)	62 (16.7)	28.960 (97.794)

LUGGING ABILITY IN 5th GEAR

Crankshaft Speed rpm	1999	1809	1593	1383	1219	985
Pull—lbs (kN)	2049 (9.11)	2183 (9.71)	2291 (10.19)	2375 (10.56)	2369 (10.54)	2370 (10.54)
Increase in Pull %	0	7	12	16	16	16
Power—Hp (kW)	31.03 (23.14)	29.81 (22.23)	27.46 (20.48)	24.64 (18.37)	21.67 (16.16)	17.51 (13.05)
Speed—Mph (km/h)	5.68 (9.14)	5.12 (8.24)	4.49 (7.23)	3.89 (6.26)	3.43 (5.52)	2.77 (4.46)
Slip %	5.48	5.92	6.14	6.46	6.46	6.46

Department of Agricultural Engineering

Dates of Test: September 14-26, 1983

Manufacturer: FORD MOTOR COMPANY, Ford Tractor Operations, 2500 East Maple Road, Troy, Michigan 48084

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° *(15°/15°)*** 0.8406 **Fuel weight** 6.999 lbs/gal *(0.829 kg/l)* **Oil SAE** 30 **API service classification** SE-SF, CC-CD **To motor** 1.472 gal *(5.570 l)* **Drained from motor** 1.300 gal *(4.921 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 39.0 hours.

ENGINE: **Make** Ford Diesel **Type** three cylinder vertical **Serial No.** *B703582* **Crankshaft** lengthwise **Rated rpm** 2000 **Bore and stroke** 4.2" × 4.2" *(106.7 mm × 106.7 mm)* **Compression ratio** 17.3 to 1 **Displacement** 175 cu in *(2868 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** *C699559* **Tread width** rear 56" *(1422 mm)* to 80" *(2032 mm)* front 52" *(1320 mm)* to 80" *(2032 mm)* **Wheel base** 77.5" *(1969 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 28.5" *(724 mm)* Vertical distance above roadway 28.1" *(715 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 1.7 *(2.7)* second 2.5 *(4.0)* third 3.6 *(5.8)* fourth 5.3 *(8.5)* fifth 6.1 *(9.8)* sixth 8.8 *(14.2)* seventh 12.9 *(20.8)* eighth 19.1 *(30.7)* reverse 2.2 *(3.5)*, 3.2 *(5.1)*, 4.7 *(7.6)*, 6.9 *(11.1)* **Clutch** single plate dry disc operated by foot pedal **Brakes** multiple wet disc operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 114" *(2.89 m)* left 114" *(2.89 m)* (on concrete surface without brake) right 136" *(3.45 m)* left 136" *(3.45 m)* **Turning space diameter** (on concrete surface with brake applied) right 233" *(5.92 m)* left 233" *(5.92 m)* (on concrete surface without brake) right 275" *(6.98 m)* left 275" *(6.98 m)* **Power take-off** 540 rpm at 1799 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

TRACTOR SOUND LEVEL WITHOUT CAB	**dB(A)**
Maximum Available Power—Two Hours	94.5
75% of Pull at Maximum Power—Ten Hours	95.0
50% of Pull at Maximum Power—Two Hours	94.0
50% of Pull at Reduced Engine Speed—Two Hours	91.5
Bystander in 8th gear	86.0

TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 13.6-28; 4; 14 *(95)*	Two 13.6-28; 4; 14 *(95)*
Ballast	—Liquid (each)	467 lb *(212 kg)*	None
	—Cast Iron (each)	133 lb *(60 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 6.00-16; 4; 36 *(250)*	Two 6.00-16; 4; 36 *(250)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	52 lb *(24 kg)*	None
Height of Drawbar		16.5 in *(420 mm)*	16.5 in *(420 mm)*
Static Weight with Operator	—Rear	4150 lb *(1882 kg)*	2950 lb *(1338 kg)*
	—Front	1805 lb *(819 kg)*	1700 lb *(771 kg)*
	—Total	5955 lb *(2701 kg)*	4650 lb *(2109 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 139°F *(59.6°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1492.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
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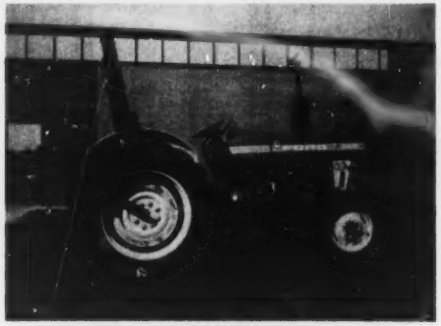
Board of Tractor Test Engineers



Ford 2910 (8x4) Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1493—FORD 3910 (8x2) DIESEL 8 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—600 rpm)								
42.62 *(31.78)*	2000	2.760 *(10.448)*	0.453 *(0.276)*	15.44 *(3.042)*	193 *(89.3)*	57 *(13.8)*	75 *(23.8)*	29.183 *(98.548)*
Standard Power Take-off Speed (540 rpm)—One Hour								
40.39 *(30.12)*	1799	2.546 *(9.638)*	0.441 *(0.268)*	15.86 *(3.125)*	195 *(90.5)*	57 *(13.9)*	75 *(23.8)*	29.180 *(98.536)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
37.13 *(27.69)*	2049	2.452 *(9.282)*	0.462 *(0.281)*	15.14 *(2.983)*	186 *(85.3)*	56 *(13.6)*	76 *(24.2)*	....
0.00 *(0.00)*	2137	0.883 *(3.343)*	....	....	152 *(66.9)*	56 *(13.6)*	75 *(23.9)*	....
19.04 *(14.20)*	2100	1.603 *(6.068)*	0.589 *(0.358)*	11.88 *(2.340)*	156 *(69.2)*	56 *(13.3)*	74 *(23.3)*	....
43.04 *(32.09)*	2000	2.773 *(10.497)*	0.451 *(0.274)*	15.52 *(3.057)*	192 *(88.9)*	56 *(13.3)*	74 *(23.3)*	....
9.58 *(7.14)*	2114	1.234 *(4.671)*	0.902 *(0.549)*	7.76 *(1.529)*	162 *(71.9)*	56 *(13.3)*	74 *(23.3)*	....
28.16 *(21.00)*	2072	2.027 *(7.673)*	0.504 *(0.307)*	13.89 *(2.737)*	184 *(84.4)*	58 *(14.2)*	77 *(25.0)*	....
Av **22.83** *Av* *(17.02)*	**2079**	**1.829** *(6.924)*	**0.561** *(0.341)*	**12.48** *(2.458)*	**172** *(77.8)*	**56** *(13.6)*	**75** *(23.8)*	**29.180** *(98.536)*

DRAWBAR PERFORMANCE

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 5th Gear											
35.62 *(26.56)*	2250 *(10.01)*	5.94 *(9.55)*	2000	5.49	2.672 *(10.114)*	0.525 *(0.319)*	13.33 *(2.626)*	188 *(86.4)*	43 *(6.1)*	54 *(11.9)*	29.245 *(98.756)*
75% of Pull at Maximum Power—Ten Hours 5th Gear											
28.99 *(21.62)*	1755 *(7.81)*	6.19 *(9.97)*	2058	4.21	2.290 *(8.670)*	0.553 *(0.336)*	12.66 *(2.493)*	181 *(82.9)*	45 *(7.2)*	57 *(13.6)*	29.182 *(98.543)*
50% of Pull at Maximum Power—Two Hours 5th Gear											
19.89 *(14.84)*	1170 *(5.20)*	6.38 *(10.26)*	2092	3.01	1.857 *(7.031)*	0.653 *(0.397)*	10.71 *(2.110)*	150 *(65.3)*	45 *(6.9)*	57 *(13.6)*	29.220 *(98.672)*
50% of Pull at Reduced Engine Speed—Two Hours 6th Gear											
19.92 *(14.85)*	1170 *(5.20)*	6.38 *(10.27)*	1676	2.89	1.615 *(6.112)*	0.567 *(0.345)*	12.34 *(2.430)*	150 *(65.6)*	44 *(6.7)*	57 *(13.6)*	29.185 *(98.553)*
MAXIMUM POWER IN SELECTED GEARS											
25.20 *(18.79)*	4931 *(21.93)*	1.92 *(3.08)*	2054	14.99	2nd Gear			178 *(80.8)*	47 *(8.3)*	53 *(11.7)*	28.950 *(97.760)*
35.24 *(26.28)*	3811 *(16.95)*	3.47 *(5.58)*	2001	9.96	3rd Gear			188 *(86.7)*	43 *(6.1)*	50 *(10.0)*	29.240 *(98.739)*
36.28 *(27.05)*	2786 *(12.39)*	4.88 *(7.86)*	2000	6.81	4th Gear			188 *(86.7)*	44 *(6.7)*	51 *(10.6)*	29.250 *(98.773)*
37.02 *(27.60)*	2340 *(10.41)*	5.93 *(9.55)*	2090	5.52	5th Gear			188 *(86.4)*	42 *(5.6)*	52 *(11.1)*	29.260 *(98.807)*
36.13 *(26.95)*	1806 *(8.03)*	7.51 *(12.08)*	2002	4.31	6th Gear			188 *(86.7)*	44 *(6.7)*	52 *(11.1)*	29.250 *(98.773)*

LUGGING ABILITY IN 5th GEAR

Crankshaft Speed rpm	2000	1801	1598	1403	1203	1009
Pull—lbs *(kN)*	2340 *(10.41)*	2462 *(10.95)*	2595 *(11.54)*	2716 *(12.08)*	2719 *(12.09)*	2713 *(12.07)*
Increase in Pull %	0	5	11	16	16	16
Power—Hp *(kW)*	37.02 *(27.60)*	34.97 *(26.07)*	32.55 *(24.27)*	29.79 *(22.22)*	25.55 *(19.05)*	21.38 *(15.95)*
Speed—Mph *(km/h)*	5.93 *(9.55)*	5.33 *(8.57)*	4.70 *(7.57)*	4.11 *(6.62)*	3.52 *(5.67)*	2.96 *(4.76)*
Slip %	5.52	5.80	6.36	6.70	6.81	6.70

Department of Agricultural Engineering

Dates of Test: September 14-26, 1983

Manufacturer: FORD MOTOR COMPANY, Ford Tractor Operations, 2500 East Maple Road, Troy, Michigan 48084

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° *(15°/15°)*** 0.8406 **Fuel weight** 6.999 lbs/gal *(0.839 kg/l)* **Oil SAE** 30 **API service classification** SE-SF, CC-CD **To motor** 1.372 gal *(5.194 l)* **Drained from motor** 1.220 gal *(4.618 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 44.0 hours.

ENGINE: Make Ford Diesel **Type** three cylinder vertical **Serial No.** *C699116* **Crankshaft** lengthwise **Rated rpm** 2000 **Bore and stroke** 4.4" × 4.2" *(112 mm × 107 mm)* **Compression ratio** 16.3 to 1 **Displacement** 192 cu in *(3147 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *C699560* **Tread width** rear 60" *(1525 mm)* to 80" *(2032 mm)* front 52" *(1320 mm)* to 80" *(2032 mm)* **Wheel base** 77.5" *(1969 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 28.7" *(729 mm)* Vertical distance above roadway 33.2" *(842 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 1.8 *(2.9)* second 2.2 *(3.5)* third 3.9 *(6.3)* fourth 5.2 *(8.4)* fifth 6.3 *(10.1)* sixth 7.8 *(12.5)* seventh 13.7 *(22.0)* eighth 18.8 *(30.2)* reverse 2.5 *(4.0)*, 9.0 *(14.5)* **Clutch** single plate dry disc operated by foot pedal **Brakes** multiple wet disc operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 114" *(2.89 m)* left 114" *(2.89 m)* (on concrete surface without brake) right 136" *(3.45 m)* left 136" *(3.45 m)* **Turning space diameter** (on concrete surface with brake applied) right 233" *(5.92 m)* left 233" *(5.92 m)* (on concrete surface without brake) right 275" *(6.98 m)* left 275" *(6.98 m)* **Power take-off** 540 rpm at 1799 engine rpm.

REPAIRS and ADJUSTMENTS: The fuel injectors were replaced during preliminary PTO tests.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	95.5
75% of Pull at Maximum Power—Ten Hours	96.0
50% of Pull at Maximum Power—Two Hours	94.5
50% of Pull at Reduced Engine Speed—Two Hours	93.5
Bystander in 8th gear	87.0

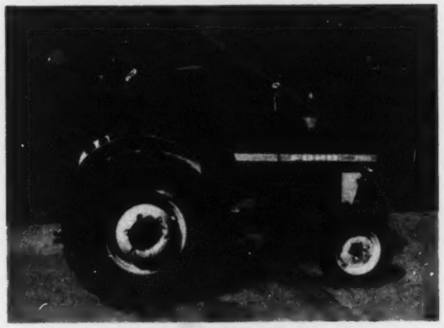
TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 16.9-24; 6; 16 *(110)*	Two 16.9-24; 6; 16 *(110)*
Ballast	—Liquid (each)	505 lb *(229 kg)*	None
	—Cast Iron (each)	330 lb *(150 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 6.50-16; 6; 36 *(250)*	Two 6.50-16; 6; 36 *(250)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	45 lb *(20 kg)*	None
Height of Drawbar		17.5 in *(445 mm)*	17.5 in *(445 mm)*
Static Weight with Operator	—Rear	4655 lb *(2111 kg)*	2985 lb *(1354 kg)*
	—Front	1785 lb *(810 kg)*	1695 lb *(769 kg)*
	—Total	6440 lb *(2921 kg)*	4680 lb *(2123 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 141°F *(60.4°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1493.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Ford 3910 (8x2) Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1494—FORD 3910 (8x4) DIESEL 8 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—600 rpm)								
42.67 *(31.82)*	2000	2.783 *(10.535)*	0.456 *(0.278)*	15.33 *(3.020)*	192 *(89.2)*	62 *(16.8)*	76 *(24.2)*	28.890 *(97.557)*
Standard Power Take-off Speed (540 rpm)—One Hour								
41.16 *(30.69)*	1799	2.632 *(9.963)*	0.448 *(0.272)*	15.64 *(3.080)*	195 *(90.8)*	62 *(16.6)*	75 *(23.7)*	28.840 *(97.388)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
36.99 *(27.58)*	2058	2.447 *(9.263)*	0.463 *(0.282)*	15.11 *(2.977)*	188 *(86.4)*	62 *(16.9)*	76 *(24.2)*	....
0.00 *(0.00)*	2133	0.827 *(3.131)*	....	....	182 *(83.3)*	62 *(16.9)*	76 *(24.2)*	....
18.93 *(14.12)*	2086	1.556 *(5.890)*	0.575 *(0.350)*	12.16 *(2.397)*	182 *(83.3)*	62 *(16.7)*	74 *(23.6)*	....
43.25 *(32.25)*	2000	2.825 *(10.694)*	0.457 *(0.278)*	15.31 *(3.016)*	192 *(88.6)*	62 *(16.7)*	74 *(23.3)*	....
9.55 *(7.12)*	2110	1.179 *(4.463)*	0.864 *(0.526)*	8.10 *(1.595)*	182 *(83.6)*	62 *(16.7)*	74 *(23.1)*	....
28.02 *(20.89)*	2060	1.989 *(7.529)*	0.497 *(0.302)*	14.09 *(2.775)*	185 *(85.0)*	62 *(16.7)*	74 *(23.3)*	....
Av 22.79 *Av (16.99)*	**2071**	**1.804** *(6.829)*	**0.554** *(0.337)*	**12.63** *(2.488)*	**185** *(85.0)*	**62** *(16.8)*	**75** *(23.6)*	**28.820** *(97.321)*

DRAWBAR PERFORMANCE

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 5th Gear											
35.06 *(26.14)*	2248 *(10.00)*	5.85 *(9.41)*	1999	5.47	2.665 *(10.087)*	0.532 *(0.324)*	13.16 *(2.592)*	194 *(90.0)*	60 *(15.3)*	74 *(23.3)*	28.910 *(97.625)*
75% of Pull at Maximum Power—Ten Hours 5th Gear											
27.96 *(20.85)*	1727 *(7.68)*	6.07 *(9.77)*	2049	4.34	2.266 *(8.578)*	0.567 *(0.345)*	12.34 *(2.431)*	185 *(84.7)*	42 *(5.6)*	49 *(9.3)*	29.193 *(98.580)*
50% of Pull at Maximum Power—Two Hours 5th Gear											
19.07 *(14.22)*	1152 *(5.12)*	6.21 *(9.99)*	2060	2.71	1.800 *(6.815)*	0.661 *(0.402)*	10.59 *(2.086)*	190 *(87.8)*	73 *(22.8)*	90 *(32.2)*	28.585 *(96.527)*
50% of Pull at Reduced Engine Speed—Two Hours 6th Gear											
19.12 *(14.26)*	1153 *(5.13)*	6.22 *(10.01)*	1418	2.65	1.450 *(5.490)*	0.531 *(0.323)*	13.18 *(2.597)*	189 *(87.2)*	73 *(22.5)*	87 *(30.6)*	28.550 *(96.409)*
MAXIMUM POWER IN SELECTED GEARS											
28.84 *(21.51)*	4934 *(21.95)*	2.19 *(3.53)*	2021	14.87		2nd Gear		187 *(85.8)*	42 *(5.6)*	50 *(10.0)*	29.190 *(98.570)*
34.89 *(26.02)*	3904 *(17.37)*	3.35 *(5.39)*	2000	9.99		3rd Gear		192 *(88.9)*	53 *(11.7)*	61 *(16.1)*	28.920 *(97.659)*
35.10 *(26.17)*	2592 *(11.53)*	5.08 *(8.17)*	1999	6.23		4th Gear		192 *(88.9)*	53 *(11.7)*	61 *(16.1)*	28.920 *(97.659)*
36.22 *(27.01)*	2323 *(10.33)*	5.85 *(9.41)*	2000	5.49		5th Gear		194 *(89.7)*	57 *(13.9)*	69 *(20.6)*	28.920 *(97.659)*
35.29 *(26.32)*	1527 *(6.79)*	8.67 *(13.95)*	1999	3.70		6th Gear		193 *(89.2)*	57 *(13.9)*	71 *(21.7)*	28.920 *(97.659)*

LUGGING ABILITY IN 5th GEAR

Crankshaft Speed rpm	2000	1802	1595	1401	1201	1001
Pull—lbs *(kN)*	2323 *(10.33)*	2525 *(11.23)*	2635 *(11.72)*	2760 *(12.28)*	2752 *(12.24)*	2708 *(12.05)*
Increase in Pull %	0	9	13	19	18	17
Power—Hp *(kW)*	36.22 *(27.01)*	35.30 *(26.33)*	32.50 *(24.24)*	29.78 *(22.21)*	25.44 *(18.97)*	20.87 *(15.56)*
Speed—Mph *(km/h)*	5.85 *(9.41)*	5.24 *(8.44)*	4.63 *(7.44)*	4.05 *(6.51)*	3.47 *(5.58)*	2.89 *(4.65)*
Slip %	5.49	6.00	6.34	6.67	6.67	6.67

Department of Agricultural Engineering

Dates of Test: September 14-26, 1983

Manufacturer: FORD MOTOR COMPANY, Ford Tractor Operations, 2500 East Maple Road, Troy, Michigan 48084

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8406 **Fuel weight** 6.999 lbs/gal *(0.839 kg/l)* **Oil SAE** 30 **API service classification** SE-SF, CC-CD **To motor** 1.423 gal *(5.387 l)* **Drained from motor** 1.280 gal *(4.844 l)* **Transmission and final drive lubricant** Ford 134 fluid **Total time engine was operated** 48.0 hours.

ENGINE: **Make** Ford Diesel **Type** three cylinder vertical **Serial No.** *C704785* **Crankshaft** lengthwise **Rated rpm** 2000 **Bore and stroke** 4.4" × 4.2" *(112 mm × 107 mm)* **Compression ratio** 16.3 to 1 **Displacement** 192 cu in *(3147 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow paper cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** *C699561* **Tread width** rear 60" *(1525 mm)* to 80" *(2032 mm)* front 52" *(1320 mm)* to 80" *(2032 mm)* **Wheel base** 77.5" *(1969 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 28.9" *(735 mm)* Vertical distance above roadway 33.2" *(842 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 1.7 *(2.7)* second 2.5 *(4.0)* third 3.7 *(5.9)* fourth 5.4 *(8.7)* fifth 6.2 *(10.0)* sixth 9.0 *(14.5)* seventh 13.2 *(21.2)* eighth 19.2 *(31.0)* reverse 2.3 *(3.7)*, 3.3 *(5.3)*, 4.8 *(7.7)*, 7.0 *(11.3)* **Clutch** single plate dry disc operated by foot pedal **Brakes** multiple wet disc operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 114" *(2.89 m)* left 114" *(2.89 m)* (on concrete surface without brake) right 136" *(3.45 m)* left 136" *(3.45 m)* **Turning space diameter** (on concrete surface with brake applied) right 233" *(5.92 m)* left 233" *(5.92 m)* (on concrete surface without brake) right 275" *(6.98 m)* left 275" *(6.98 m)* **Power take-off** 540 rpm at 1799 engine rpm.

REPAIRS and ADJUSTMENTS: During the PTO tests, the throttle control lever on the injection pump was replaced. The high idle limiting screw was replaced during drawbar tests.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	95.5
75% of Pull at Maximum Power—Ten Hours	94.5
50% of Pull at Maximum Power—Two Hours	93.5
50% of Pull at Reduced Engine Speed—Two Hours	92.5
Bystander in 8th gear	86.0

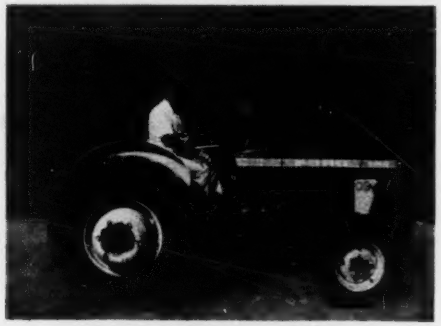
TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 16.9-24; 6; 16 *(110)*	Two 16.9-24; 6; 16 *(110)*
Ballast	—Liquid (each)	420 lb *(191 kg)*	None
	—Cast Iron (each)	410 lb *(186 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 6.50-16; 6; 36 *(250)*	Two 6.50-16; 6; 36 *(250)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	38 lb *(17 kg)*	None
Height of Drawbar		17 in *(430 mm)*	17 in *(430 mm)*
Static Weight with Operator	—Rear	4645 lb *(2107 kg)*	2985 lb *(1354 kg)*
	—Front	1790 lb *(812 kg)*	1715 lb *(778 kg)*
	—Total	6435 lb *(2919 kg)*	4700 lb *(2132 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 142°F *(61.2°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1494.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Ford 3910 (8x4) Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1495 — KUBOTA M4050DT DIESEL ALSO KUBOTA M4050 DIESEL
8 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—640 rpm)								
45.74 *(34.11)*	2602	3.156 *(11.947)*	0.483 *(0.294)*	14.49 *(2.855)*	194 *(90.3)*	68 *(20.2)*	76 *(24.2)*	29.017 *(97.985)*
Standard Power take-off Speed (540 rpm)—One Hour								
42.10 *(31.39)*	2196	2.796 *(10.584)*	0.465 *(0.283)*	15.06 *(2.966)*	197 *(91.9)*	70 *(21.1)*	78 *(25.8)*	28.985 *(97.878)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
39.44 *(29.41)*	2636	2.749 *(10.406)*	0.488 *(0.297)*	14.35 *(2.826)*	193 *(89.4)*	70 *(21.1)*	80 *(26.7)*	....
0.00 *(0.00)*	2771	1.016 *(3.846)*	....	....	180 *(82.5)*	70 *(21.1)*	80 *(26.9)*	....
20.19 *(15.06)*	2701	1.883 *(7.128)*	0.652 *(0.397)*	10.73 *(2.113)*	186 *(85.3)*	70 *(21.1)*	81 *(27.2)*	....
45.17 *(33.68)*	2600	3.143 *(11.898)*	0.487 *(0.296)*	14.37 *(2.831)*	206 *(96.9)*	70 *(20.8)*	80 *(26.9)*	....
10.25 *(7.64)*	2740	1.415 *(5.356)*	0.966 *(0.588)*	7.25 *(1.426)*	178 *(81.1)*	70 *(21.1)*	81 *(27.2)*	....
29.89 *(22.29)*	2666	2.320 *(8.782)*	0.543 *(0.330)*	12.88 *(2.538)*	188 *(86.4)*	70 *(21.1)*	80 *(26.9)*	....
Av 24.16 *Av (18.02)*	**2686**	**2.088** *(7.904)*	**0.605** *(0.368)*	**11.57** *(2.280)*	**189** *(86.9)*	**70** *(21.1)*	**81** *(27.0)*	**28.980** *(97.611)*

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 6th (H-2) Gear											
36.02 *(26.86)*	2261 *(10.06)*	5.97 *(9.62)*	2600	7.32	3.087 *(11.687)*	0.600 *(0.365)*	11.67 *(2.298)*	193 *(89.4)*	65 *(18.3)*	78 *(25.3)*	28.875 *(97.507)*
75% of Pull at Maximum Power—Ten Hours 6th (H-2) Gear											
29.29 *(21.84)*	1767 *(7.86)*	6.22 *(10.00)*	2642	5.11	2.543 *(9.626)*	0.607 *(0.369)*	11.52 *(2.269)*	189 *(87.3)*	57 *(13.7)*	63 *(16.9)*	28.728 *(97.010)*
50% of Pull at Maximum Power—Two Hours 6th (H-2) Gear											
20.26 *(15.10)*	1178 *(5.24)*	6.45 *(10.38)*	2690	3.31	2.051 *(7.763)*	0.708 *(0.431)*	9.88 *(1.945)*	187 *(85.8)*	54 *(11.9)*	56 *(13.1)*	28.815 *(97.304)*
50% of Pull at Reduced Engine Speed—Two Hours 7th (H-3) Gear											
20.24 *(15.09)*	1178 *(5.24)*	6.44 *(10.37)*	1595	3.25	1.651 *(6.250)*	0.571 *(0.347)*	12.26 *(2.415)*	186 *(85.3)*	57 *(13.9)*	64 *(17.5)*	28.790 *(97.220)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %		Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
28.58 *(21.31)*	4259 *(18.94)*	2.52 *(4.05)*	2642	14.70	3rd (L-3) Gear	191 *(88.3)*	56 *(13.3)*	59 *(15.0)*	28.810 *(97.287)*
36.61 *(27.30)*	3984 *(17.72)*	3.45 *(5.55)*	2599	13.08	4th (L-4) Gear	202 *(94.4)*	56 *(13.3)*	60 *(15.6)*	28.810 *(97.287)*
37.31 *(27.83)*	2969 *(13.21)*	4.71 *(7.58)*	2600	9.58	5th (H-1) Gear	191 *(88.1)*	62 *(16.7)*	73 *(22.8)*	28.860 *(97.456)*
37.61 *(28.05)*	2356 *(10.48)*	5.99 *(9.64)*	2598	7.05	6th (H-2) Gear	189 *(87.2)*	61 *(16.1)*	72 *(22.2)*	28.870 *(97.490)*

LUGGING ABILITY IN 6th (H-2) GEAR

Crankshaft Speed rpm	2598	2342	2080	1819	1556	1299	1031
Pull—lbs *(kN)*	2356 *(10.48)*	2428 *(10.80)*	2749 *(12.23)*	2901 *(12.90)*	2972 *(13.22)*	2993 *(13.31)*	2832 *(12.60)*
Increase in Pull %	0	3	17	23	26	27	20
Power—Hp *(kW)*	37.61 *(28.05)*	34.81 *(25.96)*	34.58 *(25.78)*	31.68 *(23.63)*	27.73 *(20.68)*	23.29 *(17.36)*	17.59 *(13.12)*
Speed—Mph *(km/h)*	5.99 *(9.64)*	5.38 *(8.65)*	4.72 *(7.59)*	4.10 *(6.59)*	3.50 *(5.63)*	2.92 *(4.70)*	2.33 *(3.75)*
Slip %	7.05	7.43	8.60	9.32	9.32	9.43	9.01

Department of Agricultural Engineering

Dates of Test: September 26 to October 7, 1983

Manufacturer: KUBOTA LTD, 2-47 Shikitsu higashi, 1-chome, Naniwa-ku, Osaka, Japan

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8403 **Fuel weight** 6.996 lbs/gal *(0.838 kg/l)* **Oil SAE** 20-20W **API service classification** SE-SF, CC-CD **To motor** 2.609 gal *(9.875 l)* **Drained from motor** 2.231 gal *(8.445 l)* **Transmission and hydraulic lubricant** Shell Donax TD or equivalent **Front axle lubricant** SAE 80/90 gear oil **Total time engine was operated** 46.5 hours.

ENGINE: **Make** Kubota Diesel **Type** six cylinder vertical **Serial No.** S2600-AL-20262 **Crankshaft** lengthwise **Rated rpm** 2600 **Bore and stroke** 3.23" × 3.23" *(82 mm × 82 mm)* **Compression ratio** 21 to 1 **Displacement** 158.5 cu in *(2598 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow paper cartridge **Fuel filter** one paper cartridge **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** front wheel assist **Serial No.** M4050DT-50355 **Tread width** rear 59.1" *(1500 mm)* to 74.8" *(1900 mm)* front 58.3" *(1480 mm)* **Wheel base** 79.5" *(2020 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal di[illegible] forward from centerline of rear whee[illegible] *mm)* Vertical distance above road [illegible]*90 mm)* Horizontal distance from cente[illegible]ar wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 1.4 *(2.2)* second 1.7 *(2.8)* third 2.9 *(4.7)* fourth 4.0 *(6.4)* fifth 5.2 *(8.4)* sixth 6.5 *(10.4)* seventh 10.9 *(17.5)* eighth 14.9 *(23.9)* reverse 1.9 *(3.0)*, 7.0 *(11.2)* **Clutch** single plate dry disc operated by foot pedal **Brakes** multiple wet disc operated by two foot pedals which can be locked together and hand lever **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 129" *(3.3 m)* left 129" *(3.3 m)* (on concrete surface without brake) right 165" *(4.2 m)* left 165" *(4.2 m)* **Turning space diameter** (on concrete surface with brake applied) right 280" *(7.1 m)* left 280" *(7.1 m)* (on concrete surface without brake) right 343" *(8.7 m)* left 343" *(8.7 m)* **Power take-off** 540 rpm at 2196 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	93.0	92.5
75% of Pull at Maximum Power—Ten Hours		93.0
50% of Pull at Maximum Power—Two Hours		93.0
50% of Pull at Reduced Engine Speed—Two Hours		88.5
Bystander in 8th (H-4) gear		80.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 6th (H-2) Gear											
36.20 *(26.99)*	2195 *(9.76)*	6.19 *(9.95)*	2600	4.47	3.016 *(11.417)*	0.583 *(0.355)*	12.00 *(2.364)*	199 *(92.5)*	68 *(20.0)*	83 *(28.1)*	28.820 *(97.321)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %		Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
24.45 *(18.23)*	6070 *(27.00)*	1.51 *(2.43)*	2667	14.93	2nd (L-2) Gear	192 *(88.9)*	55 *(12.8)*	58 *(14.4)*	28.820 *(97.321)*
37.74 *(28.14)*	2871 *(12.77)*	4.93 *(7.93)*	2600	5.74	5th (H-1) Gear	190 *(87.5)*	59 *(15.0)*	67 *(19.4)*	28.860 *(97.456)*
38.02 *(28.35)*	2310 *(10.27)*	6.17 *(9.94)*	2597	4.61	6th (H-2) Gear	190 *(87.5)*	61 *(16.1)*	72 *(22.2)*	28.870 *(97.490)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 13.6-28; 6; 22 *(150)*	Two 13.6-28; 6; 22 *(150)*
Ballast	—Liquid (each)	260 lb *(118 kg)*	None
	—Cast Iron (each)	400 lb *(181 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 8.3-20; 6; 34 *(235)*	Two 8.3-20; 6; 34 *(235)*
Ballast	—Liquid (each)	108 lb *(49 kg)*	None
	—Cast Iron (each)	370 lb *(168 kg)*	None
Height of Drawbar		14.5 in *(370 mm)*	14.5 in *(370 mm)*
Static Weight with Operator	—Rear	4280 lb *(1942 kg)*	2960 lb *(1343 kg)*
	—Front	2935 lb *(1331 kg)*	1980 lb *(898 kg)*
	—Total	7215 lb *(3273 kg)*	4940 lb *(2241 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 136°F *(57.9°C)*. Four gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. 1495.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Kubota M4050DT Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irwin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1496 — KUBOTA M4950DT DIESEL
ALSO KUBOTA M4950 DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F *(°C)* Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours (PTO Speed—640 rpm)									
	49.57	2600	3.583	0.506	13.83	189	68	75	28.820
	(36.96)		*(13.563)*	*(0.308)*	*(2.725)*	*(87.1)*	*(19.7)*	*(24.0)*	*(97.321)*
Standard Power take-off Speed (540 rpm)—One Hour									
	45.47	2194	3.094	0.476	14.70	191	68	75	28.810
	(33.91)		*(11.712)*	*(0.290)*	*(2.895)*	*(88.3)*	*(19.9)*	*(24.1)*	*(97.287)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours									
	42.76	2639	3.104	0.508	13.78	182	68	76	......
	(31.89)		*(11.750)*	*(0.309)*	*(2.714)*	*(83.6)*	*(20.0)*	*(24.4)*	......
	0.00	2759	1.157	.....	.....	180	69	76	......
	(0.00)		*(4.380)*	.....	.....	*(81.9)*	*(20.6)*	*(24.7)*	......
	21.90	2701	2.049	0.655	10.69	181	67	74	......
	(16.33)		*(7.756)*	*(0.398)*	*(2.105)*	*(82.8)*	*(19.4)*	*(23.3)*	......
	49.59	2600	3.605	0.509	13.75	188	68	74	......
	(36.98)		*(13.646)*	*(0.310)*	*(2.710)*	*(86.7)*	*(19.7)*	*(23.6)*	......
	11.05	2726	1.599	1.013	6.91	180	68	76	......
	(8.24)		*(6.053)*	*(0.616)*	*(1.361)*	*(82.2)*	*(20.3)*	*(24.4)*	......
	32.55	2678	2.564	0.551	12.70	183	67	74	......
	(24.27)		*(9.706)*	*(0.335)*	*(2.501)*	*(83.9)*	*(19.4)*	*(23.3)*	......
Av	**26.31**	**2684**	**2.346**	**0.624**	**11.21**	**182**	**68**	**75**	**28.777**
Av	***(19.62)***		***(8.881)***	***(0.380)***	***(2.209)***	***(83.3)***	***(19.9)***	***(24.0)***	***(97.174)***

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th (C-2) Gear											
40.16	3207	4.70	2598	7.69	3.495	0.609	11.49	189	67	78	29.030
(29.95)	*(14.27)*	*(7.56)*			*(13.229)*	*(0.370)*	*(2.264)*	*(87.2)*	*(19.2)*	*(25.6)*	*(98.030)*
75% of Pull at Maximum Power—Ten Hours 8th (C-2) Gear											
32.13	2456	4.91	2655	5.63	2.883	0.628	11.15	187	66	73	29.024
(23.96)	*(10.92)*	*(7.90)*			*(10.914)*	*(0.382)*	*(2.196)*	*(85.8)*	*(19.1)*	*(22.8)*	*(98.010)*
50% of Pull at Maximum Power—Two Hours 8th (C-2) Gear											
22.16	1659	5.01	2694	5.11	2.394	0.756	9.26	181	47	52	29.165
(16.52)	*(7.38)*	*(8.06)*			*(9.061)*	*(0.460)*	*(1.824)*	*(82.8)*	*(8.3)*	*(10.8)*	*(98.486)*
50% of Pull at Reduced Engine Speed—Two Hours 10th (D-1) Gear											
22.20	1655	5.02	1560	4.79	1.736	0.547	12.79	185	50	59	29.140
(16.55)	*(7.38)*	*(8.08)*			*(6.572)*	*(0.333)*	*(2.519)*	*(84.7)*	*(9.7)*	*(15.0)*	*(98.401)*
MAXIMUM POWER IN SELECTED GEARS											
31.60	5292	2.24	2653	14.80	5th (B-2) Gear			188	60	68	28.740
(23.56)	*(23.54)*	*(3.60)*						*(86.7)*	*(15.6)*	*(20.0)*	*(97.051)*
39.55	4822	3.08	2597	12.39	6th (B-3) Gear			189	58	64	28.740
(29.49)	*(21.45)*	*(4.95)*						*(87.2)*	*(14.4)*	*(17.8)*	*(97.051)*
41.22	4318	3.58	2600	10.47	7th (C-1) Gear			190	58	64	28.740
(30.73)	*(19.21)*	*(5.76)*						*(87.5)*	*(14.4)*	*(17.8)*	*(97.051)*
41.43	3316	4.68	2600	8.02	8th (C-2) Gear			189	56	62	28.720
(30.89)	*(14.75)*	*(7.54)*						*(87.2)*	*(13.3)*	*(16.7)*	*(96.983)*
40.15	2305	6.53	2596	6.01	9th (C-3) Gear			189	59	66	28.740
(29.94)	*(10.25)*	*(10.51)*						*(86.9)*	*(15.0)*	*(18.9)*	*(97.051)*
39.66	1780	8.35	2598	4.85	10th (D-1) Gear			190	59	67	28.740
(29.57)	*(7.92)*	*(13.43)*						*(87.8)*	*(15.0)*	*(19.4)*	*(97.051)*

Department of Agricultural Engineering

Dates of Test: September 23 to October 18, 1983

Manufacturer: KUBOTA LTD, 2-47 Shikitsu higashi, 1-chome, Naniwa-ku, Osaka, Japan

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° *(15°/15°)*** 0.8404 **Fuel weight** 6.998 lbs/gal *(0.839 kg/l)* **Oil SAE** 20-20W **API service classification** SE-SF, CC-CD **To motor** 3.198 gal *(12.108 l)* **Drained from motor** 2.602 gal *(9.851 l)* **Transmission and hydraulic lubricant** Shell Donax TD or equivalent **Front axle lubricant** SAE 80/90 gear oil **Total time engine was operated** 64.0 hours.

ENGINE: Make Kubota Diesel **Type** six cylinder vertical **Serial No.** S2800-A-19880 **Crankshaft** lengthwise **Rated rpm** 2600 **Bore and stroke** 3.35" × 3.23" *(85 mm × 82 mm)* **Compression ratio** 21 to 1 **Displacement** 170 cu in *(2791 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow paper cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type front wheel assist **Serial No.** M4950DTF-U50143 **Tread width** rear 55.9" *(1420 mm)* to 79.5" *(2020 mm)* front 55.9" *(1420 mm)* to 63.8" *(1620 mm)* **Wheel base** 82.3" *(2090 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 35.8" *(910 mm)* Vertical distance above roadway 35.5" *(902 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 0.9 *(1.5)* second 1.2 *(1.9)* third 1.6 *(2.6)* fourth 2.1 *(3.3)* fifth 2.6 *(4.3)* sixth 3.6 *(5.8)* seventh 4.1 *(6.6)* eighth 5.2 *(8.4)* ninth 7.1 *(11.5)* tenth 9.0 *(14.5)* eleventh 11.5 *(18.5)* twelfth 15.7 *(25.3)* reverse 0.7 *(1.1)*, 1.5 *(2.4)*, 3.0 *(4.8)*, 6.6 *(10.6)* **Clutch** single plate dry disc operated by foot pedal **Brakes** multiple wet disc operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 130" *(3.3 m)* left 130" *(3.3 m)* (on concrete surface without brake) right 158" *(4.0 m)* left 158" *(4.0 m)* **Turning space diameter** (on concrete surface with brake applied) right 276" *(7.0 m)* left 276" *(7.0 m)* (on concrete surface without brake) right 332" *(8.4 m)* left 332" *(8.4 m)* **Power take-off** 540 rpm at 2194 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 8th (C-2) GEAR

Crankshaft Speed rpm	2600	2344	2079	1818	1561	1296	1031
Pull—lbs	3316	3467	3824	4040	4170	4226	4017
(kN)	*(14.75)*	*(15.42)*	*(17.01)*	*(17.97)*	*(18.55)*	*(18.80)*	*(17.87)*
Increase in Pull %	0	5	15	22	26	27	21
Power—Hp	41.43	38.89	37.70	34.60	30.53	25.63	19.50
(kW)	*(30.89)*	*(29.00)*	*(28.11)*	*(25.80)*	*(22.76)*	*(19.11)*	*(14.54)*
Speed—Mph	4.68	4.21	3.70	3.21	2.75	2.27	1.82
(km/h)	*(7.54)*	*(6.77)*	*(5.95)*	*(5.17)*	*(4.42)*	*(3.66)*	*(2.93)*
Slip %	8.02	8.34	9.20	9.84	10.26	10.47	9.84

TRACTOR SOUND LEVEL WITHOUT CAB	**dB(A)**	**Front Wheel Drive Disengaged dB(A)**
Maximum Available Power—Two Hours	93.5	93.5
75% of Pull at Maximum Power—Ten Hours		93.5
50% of Pull at Maximum Power—Two Hours		94.5
50% of Pull at Reduced Engine Speed—Two Hours		87.5
Bystander in 12th (D-3) gear		81.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th (C-2) Gear											
40.25	3085	4.89	2599	5.95	3.445	0.599	11.68	191	67	81	28.990
(30.01)	*(13.72)*	*(7.87)*			*(13.040)*	*(0.364)*	*(2.301)*	*(88.1)*	*(19.2)*	*(27.2)*	*(97.895)*
MAXIMUM POWER IN SELECTED GEARS											
32.20	6750	1.79	2647	14.98	4th (B-1) Gear			187	59	65	29.060
(24.01)	*(30.03)*	*(2.88)*						*(86.1)*	*(15.0)*	*(18.3)*	*(98.131)*
40.75	3126	4.89	2599	6.01	8th (C-2) Gear			189	64	72	29.020
(30.39)	*(13.90)*	*(7.87)*						*(86.9)*	*(17.8)*	*(22.2)*	*(97.996)*

TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 14.9-28; 6; 16 *(110)*	Two 14.9-28; 6; 16 *(110)*
Ballast	—Liquid (each)	520 lb *(236 kg)*	None
	—Cast Iron (each)	500 lb *(227 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 8.3-24; 6; 26 *(180)*	Two 8.3-24; 6; 26 *(180)*
Ballast	—Liquid (each)	110 lb *(50 kg)*	None
	—Cast Iron (each)	68 lb *(31 kg)*	None
Height of Drawbar		13.5 in *(345 mm)*	13.5 in *(345 mm)*
Static Weight with Operator	—Rear	5370 lb *(2436 kg)*	3330 lb *(1511 kg)*
	—Front	2825 lb *(1281 kg)*	2470 lb *(1120 kg)*
	—Total	8195 lb *(3717 kg)*	5800 lb *(2631 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 131°F *(54.9°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1496.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

Kubota M4950DT Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1497 — KUBOTA M5950DT DIESEL ALSO KUBOTA M5950 DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F *(°C)* Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—643 rpm)								
58.00 *(43.25)*	2400	3.637 *(13.768)*	0.439 *(0.267)*	15.95 *(3.141)*	183 *(83.7)*	66 *(19.2)*	75 *(24.0)*	28.740 *(97.051)*
Standard Power take-off Speed (540 rpm)—One Hour								
52.81 *(39.38)*	2017	3.092 *(11.704)*	0.410 *(0.249)*	17.08 *(3.365)*	181 *(82.7)*	66 *(19.1)*	75 *(23.9)*	28.730 *(97.017)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
50.35 *(37.53)*	2451	3.074 *(11.636)*	0.427 *(0.260)*	16.37 *(3.225)*	178 *(80.8)*	66 *(18.9)*	75 *(23.9)*	....
0.00 *(0.00)*	2539	1.162 *(4.399)*	....	....	166 *(74.7)*	66 *(18.9)*	75 *(23.9)*	....
25.65 *(19.13)*	2497	1.938 *(7.336)*	0.529 *(0.322)*	13.23 *(2.608)*	170 *(76.7)*	66 *(18.9)*	75 *(23.9)*	....
58.00 *(43.25)*	2400	3.648 *(13.809)*	0.440 *(0.268)*	15.90 *(3.132)*	183 *(83.9)*	66 *(18.9)*	75 *(23.9)*	....
12.95 *(9.66)*	2522	1.492 *(5.648)*	0.806 *(0.490)*	8.68 *(1.710)*	168 *(75.3)*	66 *(18.9)*	75 *(23.9)*	....
38.09 *(28.40)*	2472	2.456 *(9.297)*	0.451 *(0.275)*	15.51 *(3.055)*	176 *(79.7)*	66 *(18.9)*	75 *(23.9)*	....
Av 30.84 *Av (23.00)*	**2480**	**2.295** *(8.688)*	**0.521** *(0.317)*	**13.44** *(2.647)*	**173** *(78.5)*	**66** *(18.9)*	**75** *(23.9)*	**28.750** *(97.084)*

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th (C-2) Gear											
48.15 *(35.91)*	3548 *(15.78)*	5.09 *(8.19)*	2400	7.23	3.530 *(13.361)*	0.513 *(0.312)*	13.64 *(2.687)*	182 *(83.3)*	59 *(14.7)*	71 *(21.4)*	28.990 *(97.895)*
75% of Pull at Maximum Power—Ten Hours 8th (C-2) Gear											
38.66 *(28.83)*	2721 *(12.10)*	5.33 *(8.57)*	2452	4.93	2.857 *(10.813)*	0.517 *(0.315)*	13.53 *(2.666)*	180 *(82.1)*	59 *(14.8)*	63 *(17.4)*	28.885 *(97.540)*
50% of Pull at Maximum Power—Two Hours 8th (C-2) Gear											
26.36 *(19.66)*	1614 *(8.07)*	5.45 *(8.77)*	2474	3.66	2.229 *(8.438)*	0.592 *(0.360)*	11.83 *(2.330)*	174 *(78.9)*	55 *(12.8)*	66 *(18.9)*	29.050 *(98.097)*
50% of Pull at Reduced Engine Speed—Two Hours 10th (D-1) Gear											
26.37 *(19.66)*	1815 *(8.07)*	5.45 *(8.77)*	1431	3.50	1.793 *(6.789)*	0.476 *(0.290)*	14.70 *(2.896)*	179 *(81.7)*	59 *(14.7)*	74 *(23.1)*	28.985 *(97.878)*
MAXIMUM POWER IN SELECTED GEARS											
36.99 *(27.59)*	5749 *(25.57)*	2.41 *(3.88)*	2455	14.82	5th (B-2) Gear			173 *(78.3)*	45 *(7.2)*	49 *(9.4)*	29.260 *(98.807)*
47.99 *(35.79)*	5432 *(24.16)*	3.31 *(5.33)*	2401	12.50	6th (B-3) Gear			180 *(82.2)*	46 *(7.8)*	49 *(9.4)*	29.270 *(98.840)*
48.54 *(36.20)*	4726 *(21.02)*	3.85 *(6.20)*	2398	10.38	7th (C-1) Gear			181 *(82.8)*	55 *(12.8)*	63 *(17.2)*	28.970 *(97.827)*
49.29 *(36.76)*	3628 *(16.14)*	5.09 *(8.20)*	2400	7.11	8th (C-2) Gear			181 *(82.8)*	53 *(11.7)*	60 *(15.6)*	28.960 *(97.794)*
48.81 *(36.40)*	2569 *(11.43)*	7.12 *(11.47)*	2401	4.84	9th (C-3) Gear			181 *(82.8)*	57 *(13.9)*	66 *(18.9)*	28.970 *(97.827)*
47.80 *(35.64)*	1970 *(8.76)*	9.10 *(14.65)*	2397	3.72	10th (D-1) Gear			182 *(83.3)*	58 *(14.4)*	68 *(20.0)*	28.980 *(97.861)*

Department of Agricultural Engineering

Dates of Test: September 26 to October 11, 1983

Manufacturer: KUBOTA LTD, 2-47 Shikitsu higashi, 1-chome, Naniwa-ku, Osaka, Japan

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8404 **Fuel weight** 6.998 lbs/gal *(0.839 kg/l)* **Oil SAE** 20-20W **API service classification** SE-SF, CC-CD **To motor** 1.990 gal *(7.535 l)* **Drained from motor** 1.792 gal *(6.785 l)* **Transmission and hydraulic lubricant** Shell Donax TD or equivalent **Front axle lubricant** SAE 80/90 gear oil **Total time engine was operated** 45.0 hours.

ENGINE: Make Kubota Diesel **Type** three cylinder vertical **Serial No.** D3200-A-19386 **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** 4.29" × 4.53" *(109 mm × 115 mm)* **Compression ratio** 17 to 1 **Displacement** 196 cu in *(3219 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow paper cartridge **Fuel filter** one paper element and water separator **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type front wheel assist **Serial No.** M5950DTF-U50039 **Tread width** rear 55.9" *(1420 mm)* to 79.5" *(2020 mm)* front 55.9" *(1420 mm)* to 63.8" *(1620 mm)* **Wheel base** 83.3" *(2115 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 36.3" *(921 mm)* Vertical distance above roadway 36.8" *(935 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 1.0 *(1.6)* second 1.3 *(2.1)* third 1.8 *(2.9)* fourth 2.3 *(3.6)* fifth 2.9 *(4.6)* sixth 3.9 *(6.3)* seventh 4.5 *(7.2)* eighth 5.7 *(9.2)* ninth 7.8 *(12.5)* tenth 9.8 *(15.8)* eleventh 12.5 *(20.1)* twelfth 17.1 *(27.5)* reverse 0.8 *(1.2)*, 1.6 *(2.6)*, 3.3 *(5.2)*, 7.1 *(11.5)* **Clutch** single plate dry disc operated by foot pedal **Brakes** multiple wet disc operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 130" *(3.3 m)* left 130" *(3.3 m)* (on concrete surface without brake) right 158" *(4.0 m)* left 158" *(4.0 m)* **Turning space diameter** (on concrete surface with brake applied) right 276" *(7.0 m)* left 276" *(7.0 m)* (on concrete surface without brake) right 331" *(8.4 m)* left 331" *(8.4 m)* **Power take-off** 540 rpm at 2017 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 8th (C-2) GEAR

Crankshaft Speed rpm	2400	2163	1914	1684	1436	1198
Pull—lbs *(kN)*	3628 *(16.14)*	3808 *(16.94)*	4090 *(18.19)*	4330 *(19.26)*	4512 *(20.07)*	4509 *(20.06)*
Increase in Pull %	0	5	13	19	24	24
Power—Hp *(kW)*	49.29 *(36.76)*	46.39 *(34.60)*	43.76 *(32.63)*	40.43 *(30.15)*	35.71 *(26.63)*	29.78 *(22.21)*
Speed—Mph *(km/h)*	5.09 *(8.20)*	4.57 *(7.35)*	4.01 *(6.46)*	3.50 *(5.63)*	2.97 *(4.78)*	2.48 *(3.99)*
Slip %	7.11	7.63	8.21	9.11	9.44	9.56

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	97.5	97.5
75% of Pull at Maximum Power—Ten Hours		97.0
50% of Pull at Maximum Power—Two Hours		96.5
50% of Pull at Reduced Engine Speed—Two Hours		91.0
Bystander in 12th (D-3) gear		87.0

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg *(kPa)*
Maximum Available Power—Two Hours 8th (C-2) Gear											
47.51 *(35.43)*	3340 *(14.86)*	5.33 *(8.58)*	2400	4.68	3.494 *(13.226)*	0.515 *(0.313)*	13.60 *(2.679)*	183 *(83.6)*	59 *(14.7)*	74 *(23.3)*	28.975 *(97.844)*
MAXIMUM POWER IN SELECTED GEARS											
42.66 *(31.81)*	8350 *(37.14)*	1.92 *(3.08)*	2434	14.90	4th (B-1) Gear			175 *(79.4)*	45 *(7.2)*	48 *(8.9)*	29.240 *(98.739)*
49.13 *(36.63)*	3457 *(15.38)*	5.33 *(8.58)*	2400	4.65	8th (C-2) Gear			181 *(82.8)*	52 *(11.1)*	56 *(13.3)*	28.950 *(97.760)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 16.9-28; 6; 16 *(110)*	Two 16.9-28; 6; 16 *(110)*
Ballast	—Liquid (each)	432 lb *(196 kg)*	None
	—Cast Iron (each)	360 lb *(163 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 9.5-24; 6; 30 *(205)*	Two 9.5-24; 6; 30 *(205)*
Ballast	—Liquid (each)	175 lb *(79 kg)*	None
	—Cast Iron (each)	585 lb *(265 kg)*	None
Height of Drawbar		15.5 in *(395 mm)*	15.5 in *(395 mm)*
Static Weight with Operator	—Rear	5110 lb *(2318 kg)*	3525 lb *(1599 kg)*
	—Front	4110 lb *(1864 kg)*	2595 lb *(1177 kg)*
	—Total	9220 lb *(4182 kg)*	6120 lb *(2776 kg)*

Kubota M5950DT Diesel

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 145°F *(62.8°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*. During inspection it was found that the exhaust valves of cylinders 1 and 2 were pitted.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1497.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
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University of Nebraska–Lincoln
Irwin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1498 — KUBOTA M6950DT DIESEL
ALSO KUBOTA M6950 DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

	Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
	MAXIMUM POWER AND FUEL CONSUMPTION								
	Rated Engine Speed—Two Hours (PTO Speed—637 rpm)								
	66.44 *(49.54)*	2400	4.123 *(15.607)*	0.434 *(0.264)*	16.11 *(3.174)*	186 *(85.4)*	69 *(20.6)*	75 *(23.8)*	28.980 *(97.861)*
	Standard Power take-off Speed (540 rpm)—One Hour								
	63.96 *(47.69)*	2036	3.767 *(14.260)*	0.412 *(0.251)*	16.98 *(3.344)*	192 *(88.7)*	69 *(20.4)*	75 *(23.7)*	28.980 *(97.861)*
	VARYING POWER AND FUEL CONSUMPTION—Two Hours								
	57.37 *(42.78)*	2436	3.558 *(13.468)*	0.434 *(0.264)*	16.12 *(3.176)*	180 *(82.2)*	68 *(20.3)*	74 *(23.6)*	....
	0.00 *(0.00)*	2537	1.269 *(4.804)*	....	....	170 *(76.7)*	69 *(20.6)*	75 *(23.9)*	....
	29.30 *(21.85)*	2492	2.341 *(8.862)*	0.539 *(0.340)*	12.52 *(2.466)*	178 *(80.8)*	70 *(20.8)*	76 *(24.4)*	....
	66.19 *(49.36)*	2400	4.081 *(15.448)*	0.431 *(0.263)*	16.22 *(3.195)*	185 *(85.0)*	69 *(20.6)*	76 *(24.2)*	....
	14.79 *(11.03)*	2514	1.783 *(6.749)*	0.844 *(0.513)*	8.29 *(1.634)*	175 *(79.4)*	70 *(20.8)*	75 *(23.9)*	....
	43.56 *(32.48)*	2468	2.902 *(10.985)*	0.466 *(0.284)*	15.01 *(2.957)*	178 *(81.1)*	69 *(20.6)*	75 *(23.9)*	....
Av **Av**	**35.20** ***(26.25)***	**2474**	**2.656** ***(10.054)***	**0.528** ***(0.321)***	**13.26** ***(2.611)***	**178** ***(80.9)***	**69** ***(20.6)***	**75** ***(24.0)***	**28.980** ***(97.861)***

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 8th (C-2) Gear											
55.50 *(41.39)*	4154 *(18.48)*	5.01 *(8.06)*	2400	8.05	4.044 *(15.308)*	0.510 *(0.310)*	13.72 *(2.704)*	185 *(84.7)*	50 *(9.7)*	56 *(13.1)*	29.270 *(98.840)*
75% of Pull at Maximum Power—Ten Hours 8th (C-2) Gear											
44.55 *(33.22)*	3179 *(14.14)*	5.25 *(8.46)*	2450	5.56	3.355 *(12.701)*	0.527 *(0.321)*	13.28 *(2.615)*	183 *(83.8)*	59 *(15.1)*	63 *(17.4)*	28.862 *(97.463)*
50% of Pull at Maximum Power—Two Hours 8th (C-2) Gear											
30.67 *(22.87)*	2121 *(9.43)*	5.42 *(8.73)*	2480	3.68	2.708 *(10.251)*	0.618 *(0.376)*	11.33 *(2.232)*	178 *(81.1)*	50 *(9.7)*	55 *(12.8)*	28.815 *(97.304)*
50% of Pull at Reduced Engine Speed—Two Hours 10th (D-1) Gear											
30.69 *(22.88)*	2121 *(9.43)*	5.43 *(8.73)*	1436	3.61	2.101 *(7.952)*	0.479 *(0.291)*	14.61 *(2.878)*	182 *(83.3)*	49 *(9.2)*	56 *(13.3)*	28.850 *(97.422)*
MAXIMUM POWER IN SELECTED GEARS											
41.49 *(30.94)*	6517 *(28.99)*	2.39 *(3.84)*	2445	14.81	5th (B-2) Gear			183 *(83.9)*	53 *(11.7)*	57 *(13.9)*	28.780 *(97.186)*
51.97 *(38.76)*	5917 *(26.32)*	3.29 *(5.30)*	2398	12.27	6th (B-3) Gear			184 *(84.4)*	51 *(10.6)*	56 *(13.3)*	28.780 *(97.186)*
54.95 *(40.97)*	5435 *(24.17)*	3.79 *(6.10)*	2398	11.38	7th (C-1) Gear			184 *(84.4)*	49 *(9.4)*	54 *(12.2)*	29.320 *(99.009)*
56.74 *(42.31)*	4239 *(18.86)*	5.02 *(8.08)*	2399	7.90	8th (C-2) Gear			184 *(84.4)*	48 *(8.9)*	53 *(11.7)*	29.330 *(99.043)*
55.73 *(41.56)*	2977 *(13.24)*	7.02 *(11.30)*	2398	5.55	9th (C-3) Gear			184 *(84.4)*	49 *(9.4)*	55 *(12.8)*	29.300 *(98.942)*
55.41 *(41.32)*	2309 *(10.27)*	9.00 *(14.48)*	2399	4.27	10th (D-1) Gear			184 *(84.2)*	49 *(9.4)*	55 *(12.8)*	29.290 *(98.908)*

Department of Agricultural Engineering

Dates of Test: September 27 to October 13, 1983

Manufacturer: KUBOTA LTD, 2-47 Shikitsu higashi, 1-chome, Naniwa-ku, Osaka, Japan

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** ***(15°/15°)*** 0.8404 **Fuel weight** 6.998 lbs/gal *(0.839 kg/l)* **Oil SAE** 20-20W **API service classification** SE-SF, CC-CD **To motor** 2.654 gal *(10.048 l)* **Drained from motor** 2.481 gal *(9.391 l)* **Transmission and hydraulic lubricant** Shell Donax TD or equivalent **Front axle lubricant** SAE 80/90 gear oil **Total time engine was operated** 40.0 hours.

ENGINE: **Make** Kubota Diesel **Type** four cylinder vertical **Serial No.** V4000-2A-20060 **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** 4.13" × 4.53" *(105 mm × 115 mm)* **Compression ratio** 17 to 1 **Displacement** 243 cu in *(3983 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow paper cartridge **Fuel filter** one paper element and water separator **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** front wheel assist **Serial No.** M6950DTF-U50093 **Tread width** rear 59.8" *(1520 mm)* to 79.5" *(2020 mm)* front 60.6" *(1540 mm)* to 68.5" *(1740 mm)* **Wheel base** 89.0" *(2260 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 38.0" *(965 mm)* Vertical distance above roadway 39.4" *(1002 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 1.0 *(1.6)* second 1.3 *(2.1)* third 1.8 *(2.8)* fourth 2.2 *(3.6)* fifth 2.8 *(4.5)* sixth 3.8 *(6.2)* seventh 4.4 *(7.0)* eighth 5.6 *(9.0)* ninth 7.6 *(12.2)* tenth 9.6 *(15.5)* eleventh 12.2 *(19.7)* twelfth 16.7 *(26.9)* reverse 0.7 *(1.2)*, 1.6 *(2.6)*, 3.2 *(5.1)*, 7.0 *(11.2)* **Clutch** single plate dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 145" *(3.7 m)* left 145" *(3.7 m)* (on concrete surface without brake) right 185" *(4.7 m)* left 185" *(4.7 m)* **Turning space diameter** (on concrete surface with brake applied) right 307" *(7.8 m)* left 307" *(7.8 m)* (on concrete surface without brake) right 386" *(9.8 m)* left 386" *(9.8 m)* **Power take-off** 540 rpm at 2036 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 8th (C-2) GEAR

Crankshaft Speed rpm	2399	2166	1913	1681	1432	1196	955
Pull—lbs *(kN)*	4239 *(18.86)*	4700 *(20.91)*	4995 *(22.22)*	5143 *(22.88)*	5216 *(23.20)*	5232 *(23.27)*	5054 *(22.48)*
Increase in Pull %	0	11	18	21	23	23	19
Power—Hp *(kW)*	56.74 *(42.31)*	56.15 *(41.87)*	52.22 *(38.94)*	46.95 *(35.01)*	40.49 *(30.19)*	33.88 *(25.26)*	26.27 *(19.59)*
Speed—Mph *(km/h)*	5.02 *(8.08)*	4.48 *(7.21)*	3.92 *(6.31)*	3.42 *(5.51)*	2.91 *(4.68)*	2.43 *(3.91)*	1.95 *(3.14)*
Slip %	7.90	8.97	9.79	10.25	10.48	10.71	10.14

TRACTOR SOUND LEVEL WITHOUT CAB	**dB(A)**	**Front Wheel Drive Disengaged dB(A)**
Maximum Available Power—Two Hours	96.5	96.5
75% of Pull at Maximum Power—Ten Hours		96.0
50% of Pull at Maximum Power—Two Hours		94.0
50% of Pull at Reduced Engine Speed—Two Hours		88.5
Bystander in 12th (D-3) gear		87.0

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 8th (C-2) Gear											
55.16 *(41.14)*	3966 *(17.64)*	5.22 *(8.40)*	2400	5.76	4.044 *(15.308)*	0.513 *(0.312)*	13.64 *(2.687)*	184 *(84.4)*	50 *(10.0)*	56 *(13.3)*	29.260 *(98.807)*
MAXIMUM POWER IN SELECTED GEARS											
42.80 *(31.92)*	8465 *(37.65)*	1.90 *(3.05)*	2440	14.96	4th (B-1) Gear			183 *(83.9)*	55 *(12.8)*	57 *(13.9)*	28.770 *(97.152)*
56.41 *(42.06)*	4063 *(18.07)*	5.21 *(8.38)*	2398	5.89	8th (C-2) Gear			184 *(84.4)*	48 *(8.9)*	53 *(11.7)*	29.310 *(98.975)*

TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-28; 6; 16 *(110)*	Two 18.4-28; 6; 16 *(110)*
Ballast	—Liquid (each)	598 lb *(271 kg)*	None
	—Cast Iron (each)	392 lb *(178 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 11.2-24; 6; 26 *(180)*	Two 11.2-24; 6; 26 *(180)*
Ballast	—Liquid (each)	195 lb *(89 kg)*	None
	—Cast Iron (each)	80 lb *(36 kg)*	None
Height of Drawbar		16 in *(405 mm)*	16 in *(405 mm)*
Static Weight with Operator	—Rear	6070 lb *(2753 kg)*	4090 lb *(1855 kg)*
	—Front	3505 lb *(1590 kg)*	2955 lb *(1340 kg)*
	—Total	9575 lb *(4343 kg)*	7045 lb *(3195 kg)*

Kubota M6950DT Diesel

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 145°F *(62.8°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1498.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
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NEBRASKA TRACTOR TEST 1499 — KUBOTA M7950DT DIESEL
ALSO KUBOTA M7950 DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—637 rpm)								
75.44 (56.26)	2400	4.669 (17.674)	0.433 (0.263)	16.16 (3.183)	199 (92.9)	69 (20.7)	75 (23.9)	29.027 (98.019)
Standard Power take-off Speed (540 rpm)—One Hour								
69.32 (51.69)	2035	4.045 (15.312)	0.408 (0.248)	17.14 (3.376)	199 (92.9)	70 (20.9)	75 (23.9)	28.965 (97.878)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
65.94 (49.17)	2468	4.099 (15.516)	0.435 (0.265)	16.09 (3.169)	186 (85.6)	70 (21.1)	75 (23.9)	…… ……
0.00 (0.00)	2548	1.312 (4.966)	…… ……	…… ……	172 (77.8)	70 (21.1)	75 (23.9)	…… ……
33.57 (25.03)	2514	2.555 (9.672)	0.533 (0.324)	13.14 (2.588)	178 (81.1)	70 (21.1)	75 (23.9)	…… ……
75.43 (56.25)	2400	4.712 (17.837)	0.437 (0.266)	16.01 (3.154)	194 (90.0)	70 (20.8)	75 (23.9)	…… ……
16.91 (12.61)	2532	1.938 (7.336)	0.802 (0.488)	8.73 (1.719)	176 (80.0)	70 (20.8)	74 (23.6)	…… ……
50.06 (37.33)	2500	3.216 (12.174)	0.449 (0.273)	15.57 (3.066)	179 (81.7)	70 (20.8)	74 (23.6)	…… ……
Av 40.32 ***Av (30.07)***	**2493**	**2.972** ***(11.250)***	**0.516** ***(0.314)***	**13.57** ***(2.673)***	**181** ***(82.6)***	**70** ***(21.0)***	**75** ***(23.8)***	**28.950** ***(97.760)***

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (C-2) Gear											
63.79 (47.57)	4543 (20.21)	5.27 (8.47)	2400	6.88	4.595 (17.393)	0.504 (0.307)	13.88 (2.735)	187 (86.0)	50 (10.0)	59 (15.0)	28.795 (97.236)
75% of Pull at Maximum Power—Ten Hours 8th (C-2) Gear											
51.37 (38.31)	3469 (15.43)	5.55 (8.94)	2485	5.17	3.717 (14.072)	0.506 (0.308)	13.82 (2.722)	182 (83.3)	40 (4.2)	46 (7.8)	28.879 (97.520)
50% of Pull at Maximum Power—Two Hours 8th (C-2) Gear											
35.04 (26.13)	2314 (10.29)	5.68 (9.14)	2505	3.81	2.937 (11.118)	0.586 (0.357)	11.93 (2.350)	178 (81.1)	43 (6.1)	51 (10.3)	29.015 (97.979)
50% of Pull at Reduced Engine Speed—Two Hours 10th (D-1) Gear											
35.02 (26.11)	2313 (10.29)	5.68 (9.14)	1449	3.67	2.337 (8.845)	0.467 (0.284)	14.99 (2.952)	183 (83.9)	45 (7.2)	55 (12.8)	28.970 (97.827)
MAXIMUM POWER IN SELECTED GEARS											
48.45 (36.13)	7244 (32.22)	2.51 (4.04)	2473	14.78	5th (B-2) Gear			180 (82.2)	40 (4.4)	45 (7.2)	29.030 (98.030)
61.40 (45.79)	6771 (30.12)	3.40 (5.47)	2400	12.75	6th (B-3) Gear			184 (84.4)	40 (4.4)	45 (7.2)	29.030 (98.030)
64.21 (47.88)	6005 (26.71)	4.01 (6.45)	2401	9.73	7th (C-1) Gear			186 (85.6)	47 (8.3)	54 (12.2)	28.840 (97.388)
65.24 (48.65)	4647 (20.67)	5.26 (8.47)	2398	6.82	8th (C-2) Gear			185 (85.0)	46 (7.8)	52 (11.1)	28.850 (97.422)
64.14 (47.83)	3267 (14.53)	7.36 (11.85)	2401	4.72	9th (C-3) Gear			185 (85.0)	48 (8.9)	55 (12.8)	28.830 (97.355)
63.64 (47.45)	2534 (11.27)	9.42 (15.16)	2402	3.57	10th (D-1) Gear			186 (85.6)	49 (9.4)	57 (13.9)	28.820 (97.321)

Department of Agricultural Engineering

Dates of Test: September 27 to October 17, 1983

Manufacturer: KUBOTA LTD, 2-47 Shikitsu higashi, 1-chome, Naniwa-ku, Osaka, Japan

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8404 **Fuel weight** 6.997 lbs/gal *(0.839 kg/l)* **Oil SAE** 20-20W **API service classification** SE-SF, CC-CD **To motor** 2.801 gal *(10.601 l)* **Drained from motor** 2.639 gal *(9.991 l)* **Transmission and hydraulic lubricant** Shell Donax TD or equivalent **Front axle lubricant** SAE 80/90 gear oil **Total time engine was operated** 43.5 hours.

ENGINE: Make Kubota Diesel **Type** four cylinder vertical **Serial No.** V4300-A-19536 **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** 4.29" × 4.53" *(109 mm × 115 mm)* **Compression ratio** 17 to 1 **Displacement** 262 cu in *(4292 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow paper cartridge **Fuel filter** one paper element and water separator **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type front wheel assist **Serial No.** M7950DTF-U50308 **Tread width** rear 59.8" *(1520 mm)* to 79.5" *(2020 mm)* front 60.6" *(1540 mm)* to 68.5" *(1740 mm)* **Wheel base** 89.0" *(2260 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 38.0" *(964 mm)* Vertical distance above roadway 39.5" *(1003 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 1.1 *(1.7)* second 1.4 *(2.2)* third 1.9 *(3.0)* fourth 2.4 *(3.8)* fifth 3.0 *(4.8)* sixth 4.1 *(6.6)* seventh 4.7 *(7.5)* eighth 6.0 *(9.6)* ninth 8.1 *(13.1)* tenth 10.3 *(16.5)* eleventh 13.1 *(21.1)* twelfth 17.9 *(28.8)* reverse 0.8 *(1.3)*, 1.7 *(2.8)*, 3.4 *(5.4)*, 7.5 *(12.0)* **Clutch** single plate dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 145" *(3.7 m)* left 145" *(3.7 m)* (on concrete surface without brake) right 185" *(4.7 m)* left 185" *(4.7 m)* **Turning space diameter** (on concrete surface with brake applied) right 307" *(7.8 m)* left 307" *(7.8 m)* (on concrete surface without brake) right 386" *(9.8 m)* left 386" *(9.8 m)* **Power take-off** 540 rpm at 2035 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 8th (C-2) GEAR

Crankshaft Speed rpm	2398	2165	1913	1681	1442	1194
Pull—lbs *(kN)*	4647 (20.67)	4918 (21.88)	5215 (23.20)	5389 (23.97)	5550 (24.71)	5546 (24.67)
Increase in Pull %	0	6	12	16	20	19
Power—Hp *(kW)*	65.24 (48.65)	62.01 (46.24)	57.73 (43.05)	52.20 (38.93)	45.99 (34.29)	37.99 (28.33)
Speed—Mph *(km/h)*	5.26 (8.47)	4.73 (7.61)	4.15 (6.68)	3.63 (5.85)	3.10 (4.99)	2.57 (4.13)
Slip %	6.82	7.26	8.02	8.39	8.76	8.76

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	97.5	97.5
75% of Pull at Maximum Power—Ten Hours		96.5
50% of Pull at Maximum Power—Two Hours		94.3
50% of Pull at Reduced Engine Speed—Two Hours		90.5
Bystander in 12th (D-3) gear		88.0

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 8th (C-2) Gear											
63.01 (46.99)	4318 (19.21)	5.47 (8.81)	2401	4.97	4.573 (17.312)	0.508 (0.309)	13.78 (2.714)	189 (87.2)	55 (12.5)	65 (18.1)	28.715 (96.966)
MAXIMUM POWER IN SELECTED GEARS											
51.28 (38.24)	9641 (42.88)	1.99 (3.21)	2466	14.89	4th (B-1) Gear			184 (84.2)	40 (4.4)	44 (6.7)	28.860 (97.456)
64.72 (48.26)	4444 (19.77)	5.46 (8.79)	2399	5.07	8th (C-2) Gear			186 (85.3)	44 (6.7)	50 (10.0)	28.860 (97.456)

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-30, 6, 16 *(110)*	Two 18.4-30, 6, 16 *(110)*
Ballast	—Liquid (each)	648 lb *(294 kg)*	None
	—Cast Iron (each)	407 lb *(185 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 11.2-24, 6, 26 *(180)*	Two 11.2-24, 6, 26 *(180)*
Ballast	—Liquid (each)	228 lb *(103 kg)*	None
	—Cast Iron (each)	320 lb *(145 kg)*	None
Height of Drawbar		17 in *(430 mm)*	17 in *(430 mm)*
Static Weight with Operator	—Rear	6230 lb *(2826 kg)*	4120 lb *(1869 kg)*
	—Front	4075 lb *(1848 kg)*	2980 lb *(1352 kg)*
	—Total	10305 lb *(4674 kg)*	7100 lb *(3221 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 149°F *(64.9°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1499.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
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University of Nebraska–Lincoln
Irwin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1500—FORD 1510 (12 x 4) MANUAL DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crankshaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—624 rpm)								
19.72 (14.71)	2800	1.474 (5.580)	0.523 (0.318)	13.38 (2.636)	202 (94.2)	67 (19.4)	75 (23.8)	29.000 (97.929)
Standard Power Take-off Speed (540 rpm)—One Hour								
20.45 (15.25)	2422	1.548 (5.860)	0.529 (0.322)	13.21 (2.602)	217 (102.6)	67 (19.4)	75 (23.7)	28.950 (97.760)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
17.01 (12.68)	2840	1.308 (4.951)	0.538 (0.327)	13.01 (2.561)	196 (91.4)	67 (19.4)	77 (25.0)	....
0.00 (0.00)	2996	0.553 (2.093)	....	....	166 (74.4)	67 (19.4)	75 (23.9)	....
8.74 (6.52)	2918	0.926 (3.505)	0.741 (0.451)	9.44 (1.860)	174 (78.9)	67 (19.4)	76 (24.7)	....
20.00 (14.91)	2803	1.483 (5.614)	0.519 (0.316)	13.48 (2.656)	203 (95.0)	67 (19.4)	76 (24.2)	....
4.42 (3.30)	2956	0.737 (2.790)	1.166 (0.710)	6.00 (1.183)	168 (75.6)	67 (19.4)	75 (23.9)	....
12.92 (9.63)	2876	1.106 (4.187)	0.599 (0.364)	11.68 (2.300)	186 (85.3)	67 (19.4)	76 (24.4)	....
Av 10.52 **Av (7.84)**	**2898**	**1.019** **(3.857)**	**0.678** **(0.412)**	**10.32** **(2.033)**	**182** **(83.4)**	**67** **(19.4)**	**76** **(24.3)**	**28.930** **(97.692)**

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crankshaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 9th (3-3) Gear											
16.15 (12.05)	1090 (4.85)	5.56 (8.94)	2800	8.11	1.451 (5.491)	0.628 (0.382)	11.14 (2.194)	182 (83.1)	49 (9.4)	50 (10.0)	28.965 (97.810)
75% of Pull at Maximum Power—Ten Hours 9th (3-3) Gear											
12.92 (9.63)	844 (3.75)	5.74 (9.24)	2861	7.09	1.259 (4.766)	0.682 (0.415)	10.26 (2.021)	173 (78.5)	46 (7.5)	47 (8.1)	29.026 (98.010)
50% of Pull at Maximum Power—Two Hours 9th (3-3) Gear											
8.97 (6.69)	563 (2.50)	5.97 (9.62)	2904	4.73	1.055 (3.995)	0.823 (0.501)	8.50 (1.674)	172 (77.5)	47 (8.3)	48 (8.6)	29.010 (97.962)
50% of Pull at Reduced Engine Speed—Two Hours 11th (4-2) Gear											
8.97 (6.69)	563 (2.50)	5.97 (9.61)	1851	4.54	0.802 (3.038)	0.626 (0.381)	11.18 (2.202)	170 (76.7)	48 (8.9)	50 (10.0)	29.015 (97.979)
MAXIMUM POWER IN SELECTED GEARS											
12.42 (9.26)	1952 (8.68)	2.39 (3.84)	2852	14.94	6th (2-3) Gear			175 (79.2)	48 (8.9)	50 (10.0)	29.000 (97.929)
15.78 (11.76)	1886 (8.39)	3.14 (5.05)	2799	14.49	7th (3-1) Gear			184 (84.4)	48 (8.9)	50 (10.0)	28.990 (97.895)
16.21 (12.09)	1453 (6.46)	4.18 (6.73)	2799	10.56	8th (3-2) Gear			182 (83.1)	48 (8.9)	50 (10.0)	28.990 (97.895)
16.63 (12.40)	1124 (5.00)	5.55 (8.94)	2799	8.14	9th (3-3) Gear			180 (82.2)	49 (9.4)	50 (10.0)	28.970 (97.827)
16.99 (12.67)	921 (4.09)	6.92 (11.14)	2799	6.70	10th (4-1) Gear			180 (82.2)	49 (9.4)	51 (10.6)	28.970 (97.827)
16.78 (12.51)	702 (3.12)	8.97 (14.43)	2800	5.26	11th (4-2) Gear			181 (82.8)	49 (9.4)	51 (10.6)	28.960 (97.794)

Department of Agricultural Engineering

Dates of Test: October 17-25, 1983

Manufacturer: ISHIKAWAJIMA-SHIBAURA MACHINERY COMPANY LTD. Tokyo, Japan

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60° *(15°/15°)*** 0.8404 **Fuel weight** 6.997 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** SE-SF, CC-CD **To motor** 1.190 gal *(4.503 l)* **Drained from motor** 0.915 gal *(3.462 l)* **Transmission and final drive lubricant** Ford M2C-134-B fluid **Total time engine was operated** 35.5 hours.

ENGINE: Make Shibaura Diesel **Type** three cylinder vertical **Serial No.** *K773-00368* **Crankshaft** lengthwise **Rated rpm** 2800 **Bore and stroke** 3.03" × 3.15" *(77 mm × 80 mm)* **Compression ratio** 23.5 to 1 **Displacement** 68.2 cu in *(1117 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *1510*UH00345* **Tread width** rear 41.3" *(1050 mm)* to 47.3" *(1200 mm)* front 39.4" *(1000 mm)* to 52" *(1320 mm)* **Wheel base** 63" *(1600 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 22.5" *(572 mm)* Vertical distance above roadway 29.9" *(760 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 0.8 *(1.2)* second 1.0 *(1.5)* third 1.3 *(2.0)* fourth 1.7 *(2.8)* fifth 2.2 *(3.5)* sixth 2.8 *(4.5)* seventh 3.8 *(6.0)* eighth 4.8 *(7.7)* ninth 6.2 *(10.0)* tenth 7.6 *(12.2)* eleventh 9.7 *(15.6)* twelfth 12.5 *(20.1)* reverse 0.9 *(1.4)*, 2.0 *(3.2)*, 4.3 *(7.0)*, 8.7 *(14.0)* **Clutch** single dry disc operated by foot pedal **Brakes** drum and shoe operated by two foot pedals which can be locked together **Steering** mechanical **Turning radius** (on concrete surface with brake applied) right 92.5" *(2.35 m)* left 92.5" *(2.35 m)* (on concrete surface without brake) right 100.4" *(2.55 m)* left 100.4" *(2.55 m)* **Turning space diameter** (on concrete surface with brake applied) right 193" *(4.90 m)* left 193" *(4.90 m)* (on concrete surface without brake) right 209" *(5.30 m)* left 209" *(5.30 m)* **Power take-off** 540 rpm at 2422 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 9th (3-3) GEAR

Crankshaft Speed rpm	2799	2527	2250	1904	1686	1394
Pull—lbs (kN)	1124 (5.00)	1427 (6.35)	1472 (6.55)	1479 (6.58)	1457 (6.48)	1422 (6.33)
Increase in Pull %	0	27	31	32	30	27
Power—Hp (kW)	16.63 (12.40)	18.66 (13.91)	17.06 (12.72)	14.90 (11.11)	12.62 (9.41)	10.23 (7.63)
Speed—Mph (km/h)	5.55 (8.94)	4.90 (7.89)	4.35 (6.99)	3.78 (6.08)	3.25 (5.23)	2.70 (4.34)
Slip %	8.14	10.15	10.56	10.89	10.81	10.40

TRACTOR SOUND LEVEL WITHOUT CAB	**dB(A)**
Maximum Available Power—Two Hours	91.0
75% of Pull at Maximum Power—Ten Hours	91.0
50% of Pull at Maximum Power—Two Hours	90.5
50% of Pull at Reduced Engine Speed—Two Hours	86.0
Bystander in 12th (4-3) gear	80.5

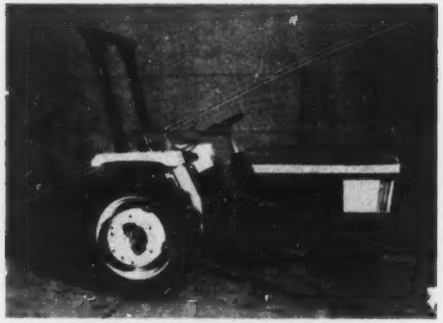
TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two,9.5-24; 4; 16 *(110)*	Two 9.5-24; 4; 16 *(110)*
Ballast	—Liquid (each)	185 lb *(84 kg)*	None
	—Cast Iron (each)	255 lb *(116 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 4.00-15; 4; 28 *(195)*	Two 4.00-15; 4; 28 *(195)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	48 lb *(22 kg)*	None
Height of Drawbar		12.5 in *(320 mm)*	12.5 in *(320 mm)*
Static Weight with Operator	—Rear	2355 lb *(1068 kg)*	1475 lb *(669 kg)*
	—Front	850 lb *(386 kg)*	755 lb *(342 kg)*
	—Total	3205 lb *(1454 kg)*	2230 lb *(1011 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 130°F *(54.4°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1500.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Ford 1510 (12 x 4) Manual Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1501—FORD 1510 (12x4) SYNCHRO DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—613 rpm)								
19.98 *(14.90)*	2800	1.525 *(5.773)*	0.534 *(0.325)*	13.10 *(2.581)*	212 *(99.7)*	67 *(19.4)*	75 *(24.1)*	29.097 *(98.255)*
Standard Power Take-off Speed (540 rpm)—One Hour								
18.68 *(13.93)*	2464	1.383 *(5.235)*	0.518 *(0.315)*	13.50 *(2.661)*	213 *(100.6)*	67 *(19.4)*	75 *(23.9)*	29.100 *(98.266)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
17.29 *(12.89)*	2850	1.346 *(5.095)*	0.545 *(0.331)*	12.84 *(2.530)*	200 *(93.3)*	67 *(19.4)*	75 *(23.9)*	......
0.00 *(0.00)*	2996	0.553 *(2.093)*	.....	.....	166 *(74.2)*	67 *(19.4)*	75 *(23.9)*	......
8.91 *(6.64)*	2936	0.926 *(3.505)*	0.727 *(0.442)*	9.62 *(1.894)*	173 *(78.3)*	68 *(20.0)*	76 *(24.7)*	......
20.41 *(15.22)*	2800	1.561 *(5.909)*	0.535 *(0.325)*	13.08 *(2.576)*	207 *(97.2)*	67 *(19.4)*	74 *(23.6)*	......
4.50 *(3.36)*	2966	0.737 *(2.790)*	1.146 *(0.698)*	6.11 *(1.204)*	166 *(74.7)*	67 *(19.4)*	74 *(23.1)*	......
13.17 *(9.82)*	2894	1.123 *(4.251)*	0.597 *(0.363)*	11.72 *(2.310)*	184 *(84.4)*	68 *(20.0)*	76 *(24.4)*	......
Av 10.71 *Av* *(7.99)*	2907	1.041 *(3.941)*	0.680 *(0.414)*	10.29 *(2.027)*	183 *(83.7)*	67 *(19.6)*	75 *(23.9)*	29.065 *(98.148)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 9th (3-3) Gear											
16.30 *(12.16)*	1106 *(4.92)*	5.53 *(8.89)*	2800	8.80	1.486 *(5.626)*	0.638 *(0.388)*	10.97 *(2.160)*	185 *(85.0)*	49 *(9.4)*	51 *(10.6)*	29.070 *(98.165)*
75% of Pull at Maximum Power—Ten Hours 9th (3-3) Gear											
13.12 *(9.78)*	846 *(3.76)*	5.82 *(9.36)*	2873	6.47	1.278 *(4.837)*	0.681 *(0.415)*	10.27 *(2.023)*	177 *(80.7)*	45 *(6.9)*	52 *(11.1)*	29.318 *(99.002)*
50% of Pull at Maximum Power—Two Hours 9th (3-3) Gear											
9.05 *(6.75)*	564 *(2.51)*	6.02 *(9.69)*	2923	4.79	1.056 *(3.998)*	0.816 *(0.496)*	8.57 *(1.689)*	173 *(78.1)*	51 *(10.6)*	54 *(11.9)*	29.100 *(98.266)*
50% of Pull at Reduced Engine Speed—Two Hours 11th (4-2) Gear											
9.05 *(6.75)*	564 *(2.51)*	6.02 *(9.69)*	1875	4.72	0.806 *(3.051)*	0.623 *(0.379)*	11.22 *(2.211)*	172 *(77.8)*	53 *(11.4)*	58 *(14.2)*	29.145 *(98.418)*
MAXIMUM POWER IN SELECTED GEARS											
15.54 *(11.59)*	1900 *(8.45)*	3.07 *(4.93)*	2813	14.99		7th (3-1) Gear		176 *(79.7)*	37 *(2.8)*	39 *(3.9)*	29.150 *(98.435)*
16.18 *(12.06)*	1483 *(6.59)*	4.09 *(6.59)*	2801	12.37		8th (3-2) Gear		182 *(83.3)*	44 *(6.7)*	45 *(7.2)*	29.030 *(98.030)*
16.64 *(12.41)*	1128 *(5.02)*	5.53 *(8.90)*	2802	8.74		9th (3-3) Gear		179 *(81.7)*	44 *(6.7)*	45 *(7.2)*	29.030 *(98.030)*
16.83 *(12.55)*	942 *(4.19)*	6.70 *(10.79)*	2799	7.62		10th (4-1) Gear		179 *(81.7)*	45 *(7.2)*	46 *(7.8)*	29.040 *(98.064)*
16.67 *(12.43)*	702 *(3.12)*	8.91 *(14.34)*	2799	5.52		11th (4-2) Gear		179 *(81.4)*	46 *(7.8)*	47 *(8.3)*	29.040 *(98.064)*

LUGGING ABILITY IN 9th (3-3) GEAR

Crankshaft Speed rpm	2802	2534	2242	1943	1683	1393	1101
Pull—lbs *(kN)*	1128 *(5.02)*	1222 *(5.44)*	1292 *(5.75)*	1287 *(5.72)*	1276 *(5.68)*	1320 *(5.87)*	1278 *(5.68)*
Increase in Pull %	0	8	15	14	13	17	13
Power—Hp *(kW)*	16.64 *(12.41)*	16.18 *(12.06)*	15.03 *(11.21)*	12.95 *(9.65)*	11.12 *(8.29)*	9.49 *(7.08)*	7.29 *(5.43)*
Speed—Mph *(km/h)*	5.53 *(8.90)*	4.97 *(7.99)*	4.36 *(7.02)*	3.77 *(6.07)*	3.27 *(5.26)*	2.70 *(4.34)*	2.14 *(3.44)*
Slip %	8.74	9.45	10.12	10.28	10.28	10.61	10.28

Department of Agricultural Engineering

Dates of Test: October 18-27, 1983

Manufacturer: ISHIKAWAJIMA-SHIBAURA MACHINERY COMPANY LTD. Tokyo, Japan

FUEL, OIL AND TIME: **Fuel** No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8404 **Fuel weight** 6.997 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** SE-SF, CC-CD **To motor** 1.119 gal *(4.236 l)* **Drained from motor** 0.803 gal *(3.041 l)* **Transmission and final drive lubricant** Ford M2C-134-B fluid **Total time engine was operated** 41.5 hours.

ENGINE: **Make** Shibaura Diesel **Type** three cylinder vertical **Serial No.** *K773-00373* **Crankshaft** lengthwise **Rated rpm** 2800 **Bore and stroke** 3.03" × 3.15" *(77 mm × 80 mm)* **Compression ratio** 23.5 to 1 **Displacement** 68.2 cu in *(1117 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: **Type** standard **Serial No.** *1510*UH00386* **Tread width** rear 41.3" *(1050 mm)* to 47.3" *(1200 mm)* front 39.4" *(1000 mm)* to 52.0" *(1320 mm)* **Wheel base** 63" *(1600 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 22.7" *(576 mm)* Vertical distance above roadway 29.9" *(760 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** *(km/h)* first 0.7 *(1.2)* second 1.0 *(1.5)* third 1.3 *(2.0)* fourth 1.6 *(2.5)* fifth 2.2 *(3.5)* sixth 2.8 *(4.5)* seventh 3.7 *(5.9)* eighth 4.8 *(7.7)* ninth 6.2 *(9.9)* tenth 7.4 *(11.9)* eleventh 9.6 *(15.5)* twelfth 12.5 *(20.1)* reverse 1.0 *(1.6)*, 2.2 *(3.5)*, 5.1 *(8.2)*, 10.3 *(16.5)* **Clutch** single dry disc operated by foot pedal **Brakes** drum and shoe operated by two foot pedals which can be locked together **Steering** mechanical **Turning radius** (on concrete surface with brake applied) right 92.5" *(2.35 m)* left 92.5" *(2.35 m)* (on concrete surface without brake) right 100.4" *(2.55 m)* left 100.4" *(2.55 m)* **Turning space diameter** (on concrete surface with brake applied) right 193" *(4.90 m)* left 193" *(4.90 m)* (on concrete surface without brake) right 209" *(5.30 m)* left 209" *(5.30 m)* **Power take-off** 540 rpm at 2464 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	91.5
75% of Pull at Maximum Power—Ten Hours	91.5
50% of Pull at Maximum Power—Two Hours	90.5
50% of Pull at Reduced Engine Speed—Two Hours	85.5
Bystander in 12th (4-3) gear	81.0

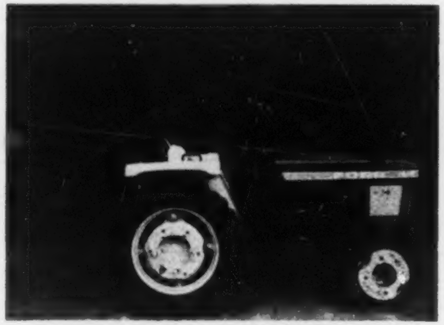
TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 9.5-24; 4; 16 *(110)*	Two 9.5-24; 4; 16 *(110)*
Ballast	—Liquid (each)	180 lb *(82 kg)*	None
	—Cast Iron (each)	228 lb *(103 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 4.00-15; 4; 32 *(220)*	Two 4.00-15; 4; 32 *(220)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	50 lb *(23 kg)*	None
Height of Drawbar		13 in *(330 mm)*	13 in *(330 mm)*
Static Weight with Operator	—Rear	2310 lb *(1048 kg)*	1495 lb *(678 kg)*
	—Front	890 lb *(404 kg)*	790 lb *(358 kg)*
	—Total	3200 lb *(1452 kg)*	2285 lb *(1036 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 134°F *(56.8°C)*. Five gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1501.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Ford 1510 (12x4) Synchro Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1502—FORD 1710 (12x4) MANUAL DIESEL
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp *(kW)*	Crank shaft speed rpm	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg *(kPa)*
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—602 rpm)								
23.88 *(17.81)*	2700	1.873 *(7.090)*	0.549 *(0.334)*	12.75 *(2.512)*	211 *(99.6)*	67 *(19.4)*	75 *(24.0)*	29.040 *(98.064)*
Standard Power Take-off Speed (540 rpm)—One Hour								
22.19 *(16.55)*	2420	1.654 *(6.261)*	0.521 *(0.317)*	13.42 *(2.643)*	207 *(97.4)*	67 *(19.4)*	75 *(23.7)*	29.035 *(98.047)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
20.71 *(15.44)*	2755	1.629 *(6.166)*	0.550 *(0.335)*	12.71 *(2.504)*	200 *(93.1)*	67 *(19.4)*	76 *(24.4)*	....
0.00 *(0.00)*	2852	0.656 *(2.483)*	....	....	166 *(74.4)*	68 *(20.0)*	78 *(25.3)*	....
10.59 *(7.90)*	2818	1.110 *(4.202)*	0.733 *(0.446)*	9.54 *(1.880)*	172 *(78.1)*	68 *(20.0)*	76 *(24.4)*	....
24.09 *(17.96)*	2703	1.882 *(7.124)*	0.547 *(0.333)*	12.80 *(2.521)*	210 *(98.9)*	68 *(20.0)*	76 *(24.7)*	....
5.31 *(3.96)*	2835	0.879 *(3.327)*	1.158 *(0.705)*	6.04 *(1.190)*	168 *(75.8)*	67 *(19.4)*	76 *(24.7)*	....
15.73 *(11.73)*	2790	1.363 *(5.160)*	0.607 *(0.369)*	11.54 *(2.273)*	177 *(80.6)*	67 *(19.4)*	74 *(23.6)*	....
Av 12.74 ***Av*** *(9.50)*	2792	1.253 *(4.743)*	0.689 *(0.419)*	10.16 *(2.002)*	182 *(83.3)*	67 *(19.7)*	76 *(24.6)*	29.020 *(97.996)*

DRAWBAR PERFORMANCE

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 9th (3-3) Gear											
19.98 *(14.90)*	1317 *(5.86)*	5.69 *(9.16)*	2699	5.80	1.759 *(6.660)*	0.616 *(0.375)*	11.36 *(2.237)*	183 *(83.9)*	50 *(10.0)*	63 *(17.2)*	29.175 *(98.520)*
75% of Pull at Maximum Power—Ten Hours 9th (3-3) Gear											
16.17 *(12.06)*	1029 *(4.58)*	5.89 *(9.48)*	2750	4.32	1.504 *(5.691)*	0.651 *(0.396)*	10.76 *(2.119)*	182 *(83.4)*	56 *(13.1)*	68 *(20.0)*	28.907 *(97.615)*
50% of Pull at Maximum Power—Two Hours 9th (3-3) Gear											
11.04 *(8.23)*	686 *(3.05)*	6.04 *(9.72)*	2780	3.00	1.230 *(4.655)*	0.780 *(0.474)*	8.98 *(1.768)*	172 *(77.8)*	53 *(11.4)*	70 *(20.8)*	29.120 *(98.334)*
50% of Pull at Reduced Engine Speed—Two Hours 11th (4-2) Gear											
11.03 *(8.23)*	685 *(3.05)*	6.04 *(9.72)*	1773	2.85	0.923 *(3.495)*	0.586 *(0.356)*	11.95 *(2.354)*	172 *(77.5)*	54 *(11.9)*	70 *(21.1)*	29.085 *(98.216)*
MAXIMUM POWER IN SELECTED GEARS											
17.12 *(12.76)*	2700 *(12.01)*	2.38 *(3.83)*	2738	14.88	6th (2-3) Gear			174 *(78.6)*	41 *(5.0)*	45 *(7.2)*	29.170 *(98.503)*
20.37 *(15.19)*	2344 *(10.42)*	3.26 *(5.24)*	2700	11.25	7th (3-1) Gear			175 *(79.4)*	44 *(6.7)*	50 *(10.0)*	29.180 *(98.536)*
20.62 *(15.38)*	1794 *(7.98)*	4.31 *(6.94)*	2699	7.88	8th (3-2) Gear			174 *(78.9)*	45 *(7.2)*	51 *(10.6)*	29.190 *(98.570)*
20.81 *(15.52)*	1372 *(6.10)*	5.69 *(9.16)*	2700	5.91	9th (3-3) Gear			175 *(79.2)*	47 *(8.3*	54 *(12.2)*	29.180 *(98.536)*
21.02 *(15.68)*	1116 *(4.96)*	7.06 *(11.37)*	2700	4.78	10th (4-1) Gear			174 *(78.9)*	47 *(8.3)*	54 *(12.2)*	29.180 *(98.536)*
20.62 *(15.37)*	849 *(3.77)*	9.11 *(14.66)*	2701	3.76	11th (4-2) Gear			174 *(78.9)*	46 *(7.8)*	52 *(11.1)*	29.190 *(98.570)*

Department of Agricultural Engineering

Dates of Test: October 17-31, 1983

Manufacturer: ISHIKAWAJIMA-SHIBAURA MACHINERY COMPANY LTD. Tokyo, Japan

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8404 **Fuel weight** 6.997 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** SE-SF, CC-CD **To motor** 1.116 gal *(4.226 l)* **Drained from motor** 0.941 gal *(3.562 l)* **Transmission and final drive lubricant** Ford M2C-134-B fluid **Total time engine was operated** 34.0 hours.

ENGINE: Make Shibaura Diesel **Type** three cylinder vertical **Serial No.** *H843-19361* **Crankshaft** lengthwise **Rated rpm** 2700 **Bore and stroke** 3.31" × 3.31" *(84 mm × 84 mm)* **Compression ratio** 23 to 1 **Displacement** 85.2 cu in *(1396 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *1710*UL00849* **Tread width** rear 43.3" *(1100 mm)* to 58.7" *(1490 mm)* front 43.5" *(1105 mm)* to 57.5" *(1460 mm)* **Wheel base** 63" *(1600 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 23.8" *(605 mm)* Vertical distance above roadway 30.7" *(780 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 0.8 *(1.2)* second 1.0 *(1.5)* third 1.3 *(2.0)* fourth 1.7 *(2.8)* fifth 2.2 *(3.5)* sixth 2.8 *(4.5)* seventh 3.8 *(6.0)* eighth 4.8 *(7.7)* ninth 6.2 *(10.0)* tenth 7.6 *(12.2)* eleventh 9.7 *(15.6)* twelfth 12.5 *(20.1)* reverse 0.9 *(1.4)*, 2.0 *(3.2)*, 4.3 *(7.0)*, 8.7 *(14.0)* **Clutch** single dry disc operated by foot pedal **Brakes** drum and shoe operated by two foot pedals which can be locked together **Steering** mechanical **Turning radius** (on concrete surface with brake applied) right 92.5" *(2.35 m)* left 92.5" *(2.35 m)* (on concrete surface without brake) right 100.4" *(2.55 m)* left 100.4" *(2.55 m)* **Turning space diameter** (on concrete surface with brake applied) right 193" *(4.90 m)* left 193" *(4.90 m)* (on concrete surface without brake) right 209" *(5.30 m)* left 209" *(5.30 m)* **Power take-off** 540 rpm at 2420 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 9th (3-3) GEAR

Crankshaft Speed rpm	2700	2432	2160	1894	1617	1347
Pull—lbs *(kN)*	1372 *(6.10)*	1482 *(6.59)*	[illegible] [illegible]	1549 *(6.89)*	1580 *(7.03)*	1531 *(6.81)*
Increase in Pull %	0	8	9	13	15	12
Power—Hp *(kW)*	20.81 *(15.52)*	20.16 *(15.04)*	18.16 *(13.54)*	16.35 *(12.19)*	14.22 *(10.60)*	11.50 *(8.57)*
Speed—Mph *(km/h)*	5.69 *(9.16)*	5.10 *(8.21)*	4.54 *(7.30)*	3.96 *(6.37)*	3.38 *(5.43)*	2.82 *(4.53)*
Slip %	5.91	6.24	6.43	6.70	6.79	6.70

TRACTOR SOUND LEVEL WITHOUT CAB	**dB(A)**
Maximum Available Power—Two Hours	90.5
75% of Pull at Maximum Power—Ten Hours	90.5
50% of Pull at Maximum Power—Two Hours	90.5
50% of Pull at Reduced Engine Speed—Two Hours	86.5
Bystander in 12th (4-3) gear	80.0

TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 11.2-24; 6; 14 *(95)*	Two 11.2-24; 6; 14 *(95)*
Ballast	—Liquid (each)	240 lb *(109 kg)*	None
	—Cast Iron (each)	230 lb *(104 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 5.00-15; 4; 32 *(220)*	Two 5.00-15; 4; 32 *(220)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	50 lb *(23 kg)*	None
Height of Drawbar		13.5 in *(345 mm)*	13.5 in *(345 mm)*
Static Weight with Operator	—Rear	2510 lb *(1138 kg)*	1570 lb *(712 kg)*
	—Front	1000 lb *(454 kg)*	900 lb *(408 kg)*
	—Total	3510 lb *(1592 kg)*	2470 lb *(1120 kg)*

Ford 1710 (12x4) Manual Diesel

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 140°F *(59.9°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1502**.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1503—FORD 1710 (12X4) SYNCHRO DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—592 rpm)								
23.79 *(17.74)*	2701	1.882 *(7.124)*	0.553 *(0.337)*	12.64 *(2.490)*	215 *(101.4)*	67 *(19.6)*	75 *(24.1)*	29.065 *(98.148)*
Standard Power Take-off Speed (540 rpm)—One Hour								
22.34 *(16.66)*	2466	1.695 *(6.416)*	0.531 *(0.323)*	13.18 *(2.597)*	210 *(98.9)*	67 *(19.4)*	75 *(23.9)*	29.090 *(98.233)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
20.76 *(15.48)*	2777	1.664 *(6.299)*	0.561 *(0.341)*	12.48 *(2.458)*	203 *(95.0)*	67 *(19.4)*	74 *(23.6)*	......
0.00 *(0.00)*	2873	0.682 *(2.582)*	......	......	168 *(75.3)*	67 *(19.4)*	74 *(23.6)*	......
10.59 *(7.90)*	2832	1.140 *(4.315)*	0.753 *(0.458)*	9.29 *(1.831)*	177 *(80.6)*	67 *(19.4)*	74 *(23.6)*	......
23.90 *(17.82)*	2700	1.912 *(7.238)*	0.560 *(0.341)*	12.50 *(2.462)*	209 *(98.3)*	66 *(19.2)*	74 *(23.6)*	......
5.32 *(3.97)*	2850	0.905 *(3.426)*	1.189 *(0.724)*	5.88 *(1.159)*	173 *(78.3)*	67 *(19.4)*	75 *(23.9)*	......
15.73 *(11.73)*	2802	1.385 *(5.243)*	0.616 *(0.375)*	11.36 *(2.237)*	188 *(86.4)*	67 *(19.4)*	75 *(23.9)*	......
Av 12.72 *Av (9.49)*	**2806**	**1.281** *(4.849)*	**0.705** *(0.429)*	**9.92** *(1.955)*	**196** *(85.7)*	**67** *(19.4)*	**75** *(23.7)*	**29.119** *(98.300)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 9th (3-3) Gear											
20.48 *(15.27)*	1351 *(6.01)*	5.69 *(9.15)*	2700	6.20	1.855 *(7.022)*	0.634 *(0.386)*	11.04 *(2.174)*	195 *(90.6)*	52 *(10.8)*	62 *(16.7)*	29.045 *(98.081)*
75% of Pull at Maximum Power—Ten Hours 9th (3-3) Gear											
16.64 *(12.41)*	1052 *(4.68)*	5.93 *(9.54)*	2775	4.84	1.575 *(5.962)*	0.662 *(0.403)*	10.56 *(2.081)*	175 *(79.3)*	42 *(5.4)*	47 *(8.3)*	29.038 *(98.057)*
50% of Pull at Maximum Power—Two Hours 9th (3-3) Gear											
11.37 *(8.48)*	701 *(3.12)*	6.08 *(9.79)*	2803	3.57	1.291 *(4.888)*	0.794 *(0.483)*	8.81 *(1.735)*	176 *(80.0)*	52 *(11.1)*	65 *(18.1)*	29.080 *(98.199)*
50% of Pull at Reduced Engine Speed—Two Hours 11th (4-2) Gear											
11.38 *(8.49)*	702 *(3.12)*	6.08 *(9.79)*	1799	3.22	0.985 *(3.730)*	0.606 *(0.368)*	11.55 *(2.275)*	177 *(80.3)*	51 *(10.3)*	63 *(16.9)*	29.135 *(98.385)*
MAXIMUM POWER IN SELECTED GEARS											
17.21 *(12.84)*	2680 *(11.92)*	2.41 *(3.88)*	2769	14.95	6th (2-3) Gear			177 *(80.6)*	52 *(11.1)*	55 *(12.8)*	28.900 *(97.591)*
19.71 *(14.69)*	2326 *(10.34)*	3.18 *(5.11)*	2699	11.50	7th (3-1) Gear			185 *(84.7)*	52 *(11.1)*	56 *(12.8)*	28.930 *(97.692)*
20.57 *(15.34)*	1803 *(8.02)*	4.28 *(6.89)*	2700	8.37	8th (3-2) Gear			183 *(83.9)*	52 *(11.1)*	56 *(13.3)*	28.960 *(97.794)*
21.23 *(15.83)*	1402 *(6.23)*	5.68 *(9.14)*	2700	6.32	9th (3-3) Gear			189 *(87.2)*	51 *(10.6)*	58 *(14.4)*	28.990 *(97.895)*
21.08 *(15.72)*	1149 *(5.11)*	6.88 *(11.08)*	2700	5.14	10th (4-1) Gear			182 *(83.3)*	52 *(11.1)*	56 *(13.3)*	28.970 *(97.827)*
20.60 *(15.36)*	851 *(3.79)*	9.08 *(14.61)*	2701	3.89	11th (4-2) Gear			182 *(83.3)*	51 *(10.6)*	57 *(13.9)*	28.980 *(97.861)*

Department of Agricultural Engineering

Dates of Test: October 17-31, 1983

Manufacturer: ISHIKAWAJIMA-SHIBAURA MACHINERY COMPANY LTD. Tokyo, Japan

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8404 **Fuel weight** 6.997 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** SE-SF, CC-CD **To motor** 1.065 gal *(4.030 l)* **Drained from motor** 0.877 gal *(3.322 l)* **Transmission and final drive lubricant** Ford M2C-134-B fluid **Total time engine was operated** 35.5 hours.

ENGINE: Make Shibaura Diesel **Type** three cylinder vertical **Serial No.** *H843-19358* **Crankshaft** lengthwise **Rated rpm** 2700 **Bore and stroke** 3.31" × 3.31" *(84 mm × 84 mm)* **Compression ratio** 23 to 1 **Displacement** 85.2 cu in *(1396 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow cartridge **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *1710*UL00919* **Tread width** rear 43.3" *(1100 mm)* to 58.7" *(1490 mm)* front 43.5" *(1105 mm)* to 57.5" *(1460 mm)* **Wheel base** 63" *(1600 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 23.8" *(605 mm)* Vertical distance above roadway 30.7" *(780 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph (km/h)** first 0.7 *(1.2)* second 1.0 *(1.5)* third 1.3 *(2.0)* fourth 1.6 *(2.6)* fifth 2.2 *(3.5)* sixth 2.8 *(4.5)* seventh 3.7 *(5.9)* eighth 4.8 *(7.7)* ninth 6.2 *(10.0)* tenth 7.4 *(11.9)* eleventh 9.6 *(15.5)* twelfth 12.5 *(20.1)* reverse 1.0 *(1.6)*, 2.2 *(3.5)*, 5.1 *(8.2)*, 10.3 *(16.6)* **Clutch** single dry disc operated by foot pedal **Brakes** drum and shoe operated by two foot pedals which can be locked together **Steering** mechanical **Turning radius** (on concrete surface with brake applied) right 92.5" *(2.35 m)* left 92.5" *(2.35 m)* (on concrete surface without brake) right 100.4" *(2.55 m)* left 100.4" *(2.55 m)* **Turning space diameter** (on concrete surface with brake applied) right 193" *(4.90 m)* left 193" *(4.90 m)* (on concrete surface without brake) right 209" *(5.30 m)* left 209" *(5.30 m)* **Power take-off** 540 rpm at 2466 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

LUGGING ABILITY IN 9th (3-3) GEAR

Crankshaft Speed rpm	2700	2432	2157	1887	1614	1344
Pull—lbs *(kN)*	1402 *(6.23)*	1425 *(6.34)*	1455 *(6.47)*	1553 *(6.91)*	1660 *(7.38)*	1651 *(7.34)*
Increase in Pull %	0	2	[illegible]	11	18	18
Power—Hp *(kW)*	21.23 *(15.83)*	19.42 *(14.48)*	17.55 *(13.09)*	16.31 *(12.17)*	14.84 *(11.07)*	12.30 *(9.17)*
Speed—Mph *(km/h)*	5.68 *(9.14)*	5.11 *(8.23)*	4.52 *([illegible])*	3.94 *(6.34)*	3.35 *(5.40)*	2.79 *(4.49)*
Slip %	6.32	6.32	6.60	7.06	7.51	7.42

TRACTOR SOUND LEVEL WITHOUT CAB	**dB(A)**
Maximum Available Power—Two Hours	91.0
75% of Pull at Maximum Power—Ten Hours	91.0
50% of Pull at Maximum Power—Two Hours	90.0
50% of Pull at Reduced Engine Speed—Two Hours	86.5
Bystander in 12th (4-3) gear	80.0

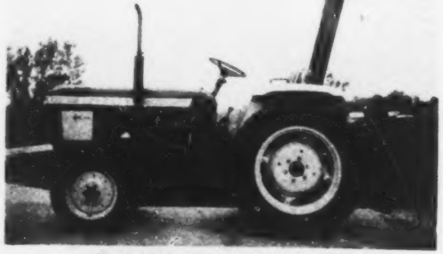
TIRES, BALLAST AND WEIGHT		**With Ballast**	**Without Ballast**
Rear Tires	—No., size, ply & psi *(kPa)*	Two 11.2-24; 6; 14 *(95)*	Two 11.2-24; 6; 14 *(95)*
Ballast	—Liquid (each)	255 lb *(116 kg)*	None
	—Cast Iron (each)	215 lb *(97 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 5.00-15; 4; 32 *(220)*	Two 5.00-15; 4; 32 *(220)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	60 lb *(27 kg)*	None
Height of Drawbar		13.5 in *(345 mm)*	13.5 in *(345 mm)*
Static Weight with Operator	—Rear	2510 lb *(1138 kg)*	1570 lb *(712 kg)*
	—Front	1020 lb *(463 kg)*	900 lb *(408 kg)*
	—Total	3530 lb *(1601 kg)*	2470 lb *(1120 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 150°F *(65.7°C)*. Six gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1503.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Ford 1710 (12x4) Synchro Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1504 — JOHN DEERE 750 DIESEL 8 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption			Temperature °F (°C)			Barometer inch Hg (kPa)
		gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cooling medium	Air wet bulb	Air dry bulb	
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—565 rpm)								
18.54	2400	1.249	0.471	14.84	196	64	75	28.940
(13.83)		*(4.728)*	*(0.287)*	*(2.925)*	*(91.1)*	*(17.6)*	*(24.0)*	*(97.726)*
Standard Power Take-off Speed (540 rpm) — One hour)								
19.80	2295	1.314	0.465	15.06	199	64	75	28.955
(14.76)		*(4.974)*	*(0.283)*	*(2.967)*	*(92.7)*	*(17.7)*	*(23.7)*	*(97.777)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
16.14	2458	1.127	0.489	14.32	187	63	75	......
(12.04)		*(4.266)*	*(0.297)*	*(2.822)*	*(86.1)*	*(17.2)*	*(23.9)*	......
0.00	2568	0.433	.....	.....	159	64	74	......
(0.00)		*(1.639)*	.....	.....	*(70.6)*	*(17.5)*	*(23.6)*	......
8.23	2516	0.772	0.656	10.67	166	63	74	......
(6.14)		*(2.922)*	*(0.399)*	*(2.101)*	*(74.7)*	*(17.2)*	*(23.6)*	......
18.84	2399	1.264	0.470	14.90	192	63	75	......
(14.05)		*(4.785)*	*(0.286)*	*(2.936)*	*(89.2)*	*(17.2)*	*(23.9)*	......
4.17	2542	0.600	1.007	6.95	162	64	75	......
(3.11)		*(2.271)*	*(0.613)*	*(1.369)*	*(72.2)*	*(17.5)*	*(23.9)*	......
12.20	3481	0.934	0.536	13.06	172	62	74	......
(9.10)		*(3.536)*	*(0.326)*	*(2.574)*	*(77.8)*	*(16.9)*	*(23.3)*	......
Av 9.93	**2494**	**0.855**	**0.605**	**11.61**	**173**	**63**	**75**	**28.970**
Av *(7.40)*		***(3.237)***	***(0.367)***	***(2.286)***	***(78.4)***	***(17.3)***	***(23.7)***	***(97.827)***

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption			Temp. °F (°C)			Barom inch Hg (kPa)
					gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Cool-ing med	Air wet bulb	Air dry bulb	
Maximum Available Power—Two Hours 7th Gear											
15.30	895	6.41	2399	5.98	1.226	0.581	12.48	180	57	61	28.785
(11.41)	*(3.98)*	*(10.32)*			*(4.640)*	*(0.341)*	*(2.459)*	*(81.9)*	*(13.6)*	*(15.8)*	*(97.203)*
75% of Pull at Maximum Power—Ten Hours 7th Gear											
12.09	691	6.56	2449	5.75	1.048	0.607	11.53	171	51	52	28.750
(9.01)	*(3.07)*	*(10.55)*			*(3.967)*	*(0.369)*	*(2.272)*	*(76.9)*	*(10.6)*	*(11.1)*	*(97.084)*
50% of Pull at Maximum Power—Two Hours 7th Gear											
8.44	461	6.87	2494	3.04	0.858	0.712	9.83	170	60	66	28.720
(6.29)	*(2.05)*	*(11.06)*			*(3.248)*	*(0.433)*	*(1.937)*	*(76.7)*	*(15.3)*	*(18.6)*	*(96.981)*
50% of Pull at Reduced Engine Speed—Two Hours 8th Gear											
8.46	461	6.88	1543	2.99	0.672	0.556	12.58	171	58	62	28.710
(6.31)	*(2.05)*	*(11.07)*			*(2.545)*	*(0.338)*	*(2.478)*	*(76.9)*	*(14.2)*	*(16.4)*	*(95.949)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
13.45	1661	3.04	2432	14.76	5th Gear	173	52	54	28.820
(10.03)	*(7.39)*	*(4.89)*				*(78.3)*	*(11.1)*	*(12.2)*	*(97.321)*
15.30	1369	4.19	2399	9.96	6th Gear	175	52	54	28.820
(11.41)	*(6.09)*	*(6.75)*				*(79.4)*	*(11.1)*	*(12.2)*	*(97.321)*
15.73	921	6.41	2399	6.03	7th Gear	181	58	62	28.780
(11.73)	*(4.09)*	*(10.31)*				*(82.8)*	*(14.4)*	*(16.7)*	*(97.186)*

LUGGING ABILITY IN 7th GEAR

Crankshaft Speed rpm	2399	2155	1916	1680	1433	1193
Pull—lbs	921	1136	1254	1337	1287	1187
(kN)	*(4.09)*	*(5.05)*	*(5.58)*	*(5.95)*	*(5.72)*	*(5.28)*
Increase in Pull %	0	23	36	45	40	29
Power—Hp	15.73	17.14	16.65	15.42	12.70	9.84
(kW)	*(11.73)*	*(12.78)*	*(12.43)*	*(11.50)*	*(9.47)*	*(7.33)*
Speed—Mph	6.41	5.66	4.98	4.32	3.70	3.11
(km/h)	*(10.31)*	*(9.11)*	*(8.02)*	*(6.96)*	*(5.95)*	*(5.00)*
Slip %	6.03	7.60	8.54	9.46	9.13	8.29

Department of Agricultural Engineering

Dates of Test: October 31 to November 10, 1983

Manufacturer: YANMAR DIESEL ENGINE COMPANY, LTD., Osaka, Japan

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8406 **Fuel weight** 6.999 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 0.848 gal *(3.209 l)* **Drained from motor** 0.715 gal *(2.707 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic oil **Total time engine was operated** 37.0 hours.

ENGINE: Make Yanmar Diesel **Type** three cylinder vertical **Serial No.** *CH3043D006271* **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** 3.15" × 3.35" *(80 mm × 85 mm)* **Compression ratio** 22.5 to 1 **Displacement** 78.2 cu in *(1281 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** one paper element **Oil filter** one full flow paper cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil **Fuel filter** one paper element **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *CH750S007229* **Tread width** rear 35.0" *(889 mm)* to 39.0" *(991 mm)* front 35.4" *(900 mm)* **Wheel base** 61.0" *(1550 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 24.5" *(622 mm)* Vertical distance above roadway 26.3" *(668 mm)* Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** *(km/h)* first 0.8 *(1.3)* second 1.1 *(1.8)* third 1.6 *(2.6)* fourth 2.6 *(4.2)* fifth 3.6 *(5.8)* sixth 4.8 *(7.7)* seventh 7.0 *(11.3)* eighth 11.4 *(18.3)* reverse 0.9 *(1.4)*, 3.9 *(6.2)* **Clutch** single dry disc operated by foot pedal **Brakes** drum and shoe operated by two foot pedals which can be locked together **Steering** mechanical **Turning radius** (on concrete surface with brake applied) right 86.5" *(2.2 m)* left 86.5" *(2.2 m)* (on concrete surface without brake) right 94.5" *(2.4 m)* left 94.5" *(2.4 m)* **Turning space diameter** (on concrete surface with brake applied) right 177" *(4.5 m)* left 177" *(4.5 m)* (on concrete surface without brake) right 193" *(4.9 m)* left 193" *(4.9 m)* **Power take-off** 540 rpm at 2295 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	89.5
75% of Pull at Maximum Power—Ten Hours	88.5
50% of Pull at Maximum Power—Two Hours	88.0
50% of Pull at Reduced Engine Speed—Two Hours	85.5
Bystander in 8th gear	75.5

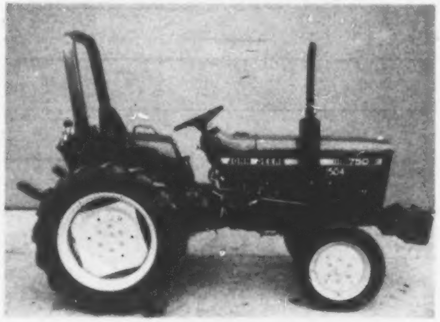
TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 9.5-24; 4; 12 *(85)*	Two 9.5-24; 4; 12 *(85)*
Ballast	—Liquid (each)	None	None
	—Test Equip (each)	60 lb *(27 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 4.00-15; 4; 52 *(360)*	Two 4.00-15; 4; 52 *(360)*
Ballast	—Liquid (each)	None	None
	—Test Equip (each)	18 lb *(8 kg)*	None
Height of Drawbar		13 in *(330 mm)*	13 in *(330 mm)*
Static Weight with Operator	—Rear	1385 lb *(628 kg)*	1265 lb *(574 kg)*
	—Front	765 lb *(347 kg)*	730 lb *(331 kg)*
	—Total	2150 lb *(975 kg)*	1995 lb *(905 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 143°F *(61.8°C)*. Three gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1504.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



John Deere 750 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1505 — JOHN DEERE 1450 DIESEL 9 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—579 rpm)								
51.39 *(38.32)*	2400	2.958 *(11.197)*	0.403 *(0.245)*	17.38 *(3.422)*	186 *(85.6)*	61 *(16.0)*	75 *(23.9)*	28.740 *(97.051)*
Standard Power Take-off Speed (540 rpm) — One hour)								
50.93 *(37.98)*	2237	2.893 *(10.951)*	0.398 *(0.242)*	17.60 *(3.468)*	186 *(85.6)*	61 *(16.1)*	75 *(23.7)*	28.715 *(96.966)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
44.73 *(33.36)*	2458	2.666 *(10.092)*	0.417 *(0.254)*	16.78 *(3.306)*	184 *(84.4)*	61 *(16.1)*	75 *(23.9)*	....
0.00 *(0.00)*	2556	0.862 *(3.263)*	....	....	179 *(81.7)*	60 *(15.8)*	74 *(23.1)*	....
22.77 *(16.98)*	2503	1.732 *(6.556)*	0.532 *(0.324)*	13.15 *(2.590)*	182 *(83.1)*	59 *(15.3)*	74 *(23.3)*	....
51.10 *(38.11)*	2400	2.945 *(11.148)*	0.403 *(0.245)*	17.35 *(3.419)*	187 *(86.1)*	59 *(15.0)*	75 *(23.9)*	....
11.56 *(8.62)*	2537	1.286 *(4.868)*	0.779 *(0.474)*	8.99 *(1.771)*	180 *(82.2)*	58 *(14.7)*	74 *(23.6)*	....
33.83 *(25.23)*	2478	2.216 *(8.388)*	0.459 *(0.279)*	15.26 *(3.008)*	183 *(83.9)*	58 *(14.4)*	74 *(23.6)*	....
Av 27.33 *Av* *(20.38)*	2489	1.951 *(7.385)*	0.500 *(0.304)*	14.01 *(2.760)*	182 *(83.6)*	59 *(15.2)*	74 *(23.6)*	28.720 *(96.983)*

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp °F (°C) Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
Maximum Available Power—Two Hours 6th (II-3) Gear											
43.17 *(32.19)*	2951 *(13.12)*	5.49 *(8.83)*	2400	5.33	2.929 *(11.087)*	0.475 *(0.289)*	14.74 *(2.903)*	188 *(86.7)*	63 *(17.2)*	69 *(20.3)*	29.020 *(97.996)*
75% of Pull at Maximum Power—Ten Hours 6th (II-3) Gear											
34.68 *(25.86)*	2244 *(9.98)*	5.79 *(9.33)*	2497	3.87	2.538 *(9.606)*	0.512 *(0.312)*	13.67 *(2.692)*	177 *(80.5)*	42 *(5.3)*	43 *(5.9)*	29.171 *(98.506)*
50% of Pull at Maximum Power—Two Hours 6th (II-3) Gear											
23.36 *(17.42)*	1496 *(6.65)*	5.86 *(9.43)*	2494	2.70	2.007 *(7.599)*	0.601 *(0.366)*	11.64 *(2.293)*	179 *(81.4)*	63 *(17.2)*	66 *(18.6)*	28.960 *(97.794)*
50% of Pull at Reduced Engine Speed—Two Hours 7th (III-1) Gear											
23.35 *(17.41)*	1496 *(6.65)*	5.85 *(9.42)*	1809	2.64	1.643 *(6.220)*	0.493 *(0.300)*	14.21 *(2.799)*	184 *(84.2)*	61 *(16.1)*	66 *(18.6)*	28.975 *(97.844)*

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cooling med	Air wet bulb	Air dry bulb	Barom inch Hg (kPa)
36.28 *(27.06)*	5321 *(23.67)*	2.56 *(4.12)*	2441	14.88	4th (II-1) Gear	186 *(85.6)*	63 *(17.2)*	70 *(21.1)*	29.010 *(97.962)*
43.31 *(32.30)*	4060 *(18.06)*	4.00 *(6.44)*	2398	7.98	5th (II-2) Gear	188 *(86.4)*	63 *(17.2)*	70 *(21.1)*	29.010 *(97.962)*
43.75 *(32.62)*	2992 *(13.31)*	5.48 *(8.83)*	2401	5.38	6th (II-3) Gear	188 *(86.7)*	63 *(17.2)*	70 *(21.1)*	29.020 *(97.996)*
43.79 *(32.66)*	2137 *(9.51)*	7.68 *(12.37)*	2401	3.72	7th (III-1) Gear	188 *(86.7)*	63 *(17.2)*	70 *(21.1)*	29.020 *(97.996)*

LUGGING ABILITY IN 6th (II-3) GEAR

Crankshaft Speed rpm	2401	2162	1910	1676	1437	1197
Pull—lbs *(kN)*	2992 *(13.31)*	3330 *(14.81)*	3604 *(16.03)*	3736 *(16.62)*	3810 *(16.95)*	3736 *(16.62)*
Increase in Pull %	0	11	20	25	27	25
Power—Hp *(kW)*	43.75 *(32.62)*	43.53 *(32.46)*	41.43 *(30.90)*	37.46 *(27.93)*	32.67 *(24.36)*	26.73 *(19.93)*
Speed—Mph *(km/h)*	5.48 *(8.83)*	4.90 *(7.89)*	4.31 *(6.94)*	3.76 *(6.05)*	3.22 *(5.17)*	2.68 *(4.32)*
Slip %	5.38	6.11	6.82	7.17	7.29	7.03

Department of Agricultural Engineering

Dates of Test: October 31 to November 9, 1983

Manufacturer: YANMAR DIESEL ENGINE COMPANY, LTD., Osaka, Japan

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8406 **Fuel weight** 6.999 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 2.320 gal *(8.784 l)* **Drained from motor** 2.093 gal *(7.922 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic oil **Total time engine was operated** 47.0 hours.

ENGINE: Make Yanmar Diesel **Type** four cylinder vertical **Serial No.** *CH4078D000106* **Crankshaft** lengthwise **Rated rpm** 2400 **Bore and stroke** 3.74" × 4.33" *(95 mm × 110 mm)* **Compression ratio** 18.1 to 1 **Displacement** 190 cu in *(3118 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil **Fuel filter** one paper cartridge and prestrainer **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *CH1450A001010* **Tread width** rear 51.2" *(1300 mm)* to 78.7" *(2000 mm)* front 55.9" *(1420 mm)* to 80.7" *(2050 mm)* **Wheel base** 82.8" *(2102 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 30.3" *(769 mm)* Vertical distance above roadway 31.8" *(808 mm)* Horizontal distance from center of rear wheel tread 0.2" *(5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 1.3 *(2.1)* second 1.9 *(3.1)* third 2.5 *(4.1)* fourth 3.0 *(4.9)* fifth 4.4 *(7.2)* sixth 5.9 *(9.6)* seventh 8.2 *(13.1)* eighth 12.0 *(19.4)* ninth 16.0 *(25.8)* reverse 1.9 *(3.1)*, 4.5 *(7.2)* **Clutch** single dry disc operated by foot pedal **Brakes** wet disc hydraulically operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 118" *(3.0 m)* left 118" *(3.0 m)* (on concrete surface without brake) right 138" *(3.5 m)* left 138" *(3.5 m)* **Turning space diameter** (on concrete surface with brake applied) right 244" *(6.2 m)* left 244" *(6.2 m)* (on concrete surface without brake) right 284" *(7.2 m)* left 284" *(7.2 m)* **Power take-off** 540 rpm at 2237 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	94.5
75% of Pull at Maximum Power—Ten Hours	93.5
50% of Pull at Maximum Power—Two Hours	94.0
50% of Pull at Reduced Engine Speed—Two Hours	90.0
Bystander in 9th (III-3) gear	87.0

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 16.9-28; 6; 16 *(110)*	Two 16.9-28; 6; 16 *(110)*
Ballast	—Liquid (each)	482 lb *(219 kg)*	None
	—Cast Iron (each)	150 lb *(68 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 7.50-16; 6; 36 *(250)*	Two 7.50-16; 6; 36 *(250)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	38 lb *(17 kg)*	None
Height of Drawbar		18.5 in *(470 mm)*	18.5 in *(470 mm)*
Static Weight with Operator	—Rear	4625 lb *(2098 kg)*	3360 lb *(1524 kg)*
	—Front	1945 lb *(882 kg)*	1870 lb *(848 kg)*
	—Total	6570 lb *(2980 kg)*	5230 lb *(2372 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 139°F *(59.6°C)*. Four gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1505.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

John Deere 1450 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

NEBRASKA TRACTOR TEST 1506 — JOHN DEERE 1650 DIESEL 9 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—555 rpm)								
62.22 (46.40)	2300	3.338 (12.636)	0.376 (0.228)	18.64 (3.672)	187 (86.1)	64 (17.6)	75 (23.8)	29.027 (98.019)
Standard Power Take-off Speed (540 rpm) — One hour)								
62.70 (46.76)	2237	3.333 (12.617)	0.372 (0.226)	18.81 (3.706)	188 (86.8)	63 (17.2)	75 (24.1)	29.020 (97.996)
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
53.92 (40.21)	2344	2.975 (11.262)	0.386 (0.235)	18.13 (3.570)	184 (84.4)	63 (17.2)	75 (23.9)	....
0.00 (0.00)	2476	0.827 (3.131)	....	....	177 (80.6)	63 (17.2)	75 (23.9)	....
27.82 (20.75)	2417	1.907 (7.219)	0.480 (0.292)	14.58 (2.874)	178 (80.8)	62 (16.9)	74 (23.6)	....
62.71 (46.76)	2300	3.343 (12.655)	0.373 (0.227)	18.76 (3.695)	186 (85.8)	63 (17.2)	74 (23.6)	....
14.11 (10.52)	2453	1.363 (5.160)	0.676 (0.411)	10.35 (2.039)	178 (81.4)	64 (17.8)	75 (23.9)	....
41.20 (30.72)	2388	2.447 (9.263)	0.416 (0.253)	16.83 (3.316)	180 (81.9)	63 (17.2)	74 (23.1)	....
Av 33.29 **Av (24.82)**	**2396**	**2.144** **(8.116)**	**0.451** **(0.274)**	**15.53** **(3.058)**	**181** **(82.5)**	**63** **(17.3)**	**75** **(23.7)**	**29.010** **(97.962)**

DRAWBAR PERFORMANCE

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 6th (II-3) Gear											
53.13 (39.62)	3583 (15.94)	5.56 (8.95)	2290	6.07	3.329 (12.602)	0.439 (0.267)	15.96 (3.144)	183 (83.9)	51 (10.5)	54 (11.9)	28.915 (97.642)
75% of Pull at Maximum Power—Ten Hours 6th (II-3) Gear											
42.77 (31.89)	2733 (12.16)	5.87 (9.45)	2387	4.52	2.856 (10.812)	0.467 (0.284)	14.97 (2.950)	178 (80.9)	34 (1.2)	37 (2.8)	29.058 (98.125)
50% of Pull at Maximum Power—Two Hours 6th (II-3) Gear											
29.24 (21.81)	1822 (8.10)	6.02 (9.69)	2419	3.35	2.257 (8.545)	0.540 (0.329)	12.95 (2.552)	173 (78.1)	30 (−1.4)	31 (−0.8)	29.100 (98.266)
50% of Pull at Reduced Engine Speed—Two Hours 7th (III-1) Gear											
29.24 (21.80)	1822 (8.10)	6.02 (9.69)	1757	3.32	1.922 (7.274)	0.460 (0.280)	15.21 (2.997)	174 (78.9)	31 (−0.6)	33 (0.6)	29.065 (98.148)

MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Gear	Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
45.94 (34.26)	6572 (29.23)	2.62 (4.22)	2337	14.60	4th (II-1) Gear	175 (79.2)	29 (−1.7)	30 (−1.1)	29.090 (98.233)
53.66 (40.01)	4970 (22.11)	4.05 (6.52)	2302	9.06	5th (II-2) Gear	184 (84.4)	46 (7.8)	48 (8.9)	29.000 (97.929)
54.03 (40.29)	3644 (16.21)	5.56 (8.95)	2302	6.23	6th (II-3) Gear	184 (84.4)	47 (8.3)	49 (9.4)	28.990 (97.895)
54.06 (40.31)	2602 (11.57)	7.70 (12.54)	2301	4.42	7th (III-1) Gear	184 (84.4)	45 (7.2)	48 (8.9)	29.000 (97.929)

LUGGING ABILITY IN 6th (II-3) GEAR

Crankshaft Speed rpm	2302	2073	1838	1613	1383	1148
Pull—lbs (kN)	3644 (16.21)	4015 (17.86)	4293 (19.10)	4361 (19.40)	4366 (19.42)	4105 (18.26)
Increase in Pull %	0	10	18	20	20	13
Power—Hp (kW)	54.03 (40.29)	53.26 (39.72)	50.20 (37.43)	44.64 (33.29)	38.29 (28.55)	30.03 (22.39)
Speed—Mph (km/h)	5.56 (8.95)	4.97 (8.01)	4.38 (7.05)	3.84 (6.18)	3.29 (5.29)	2.74 (4.41)
Slip %	6.23	6.84	7.32	7.56	7.56	7.32

Department of Agricultural Engineering

Dates of Test: October 31 to November 11, 1983

Manufacturer: YANMAR DIESEL ENGINE COMPANY, LTD., Osaka, Japan

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 47.0 (rating taken from oil company's inspection data) **Specific gravity converted to 60°/60°** *(15°/15°)* 0.8406 **Fuel weight** 6.999 lbs/gal *(0.839 kg/l)* **Oil SAE** 15W-40 **API service classification** CD, CC, SD **To motor** 1.927 gal *(7.296 l)* **Drained from motor** 1.565 gal *(5.922 l)* **Transmission and final drive lubricant** John Deere Hy-Gard transmission and hydraulic oil **Total time engine was operated** 35.5 hours.

ENGINE: Make Yanmar Diesel **Type** four cylinder vertical with turbocharger **Serial No.** *CH4078T000109* **Crankshaft** lengthwise **Rated rpm** 2300 **Bore and stroke** 3.74" × 4.33" *(95 mm × 110 mm)* **Compression ratio** 16.8 to 1 **Displacement** 190 cu in *(3118 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil **Fuel filter** one paper cartridge and prestrainer **Muffler** vertical **Cooling medium temperature control** one thermostat.

CHASSIS: Type standard **Serial No.** *CH1650A001016* **Tread width** rear 63.0" *(1600 mm)* to 75.0" *(1905 mm)* front 55.9" *(1420 mm)* to 80.7" *(2050 mm)* **Wheel base** 82.8" *(2102 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 30.0" *(763 mm)* Vertical distance above roadway 32.3" *(820 mm)* Horizontal distance from center of rear wheel tread 0.2" *(5 mm)* to the left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph** *(km/h)* first 1.3 *(2.1)* second 1.9 *(3.1)* third 2.5 *(4.1)* fourth 3.0 *(4.8)* fifth 4.4 *(7.1)* sixth 5.9 *(9.5)* seventh 8.1 *(13.1)* eighth 11.9 *(19.2)* ninth 15.9 *(25.6)* reverse 1.9 *(3.1)*, 4.4 *(7.2)* **Clutch** single dry disc operated by foot pedal **Brakes** wet disc hydraulically operated by two foot pedals which can be locked together **Steering** power assist **Turning radius** (on concrete surface with brake applied) right 118" *(3.0 m)* left 118" *(3.0 m)* (on concrete surface without brake) right 138" *(3.5 m)* left 138" *(3.5 m)* **Turning space diameter** (on concrete surface with brake applied) right 244" *(6.2 m)* left 244" *(6.2 m)* (on concrete surface without brake) right 284" *(7.2 m)* left 284" *(7.2 m)* **Power take-off** 540 rpm at 2237 engine rpm.

REPAIRS and ADJUSTMENTS: No repairs or adjustments.

TRACTOR SOUND LEVEL WITHOUT CAB	dB(A)
Maximum Available Power—Two Hours	93.5
75% of Pull at Maximum Power—Ten Hours	92.5
50% of Pull at Maximum Power—Two Hours	92.5
50% of Pull at Reduced Engine Speed—Two Hours	90.5
Bystander in 9th (III-3) gear	86.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-26; 6; 16 *(110)*	Two 18.4-26; 6; 16 *(110)*
Ballast	—Liquid (each)	812 lb *(368 kg)*	None
	—Cast Iron (each)	390 lb *(177 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 7.50-16; 6; 36 *(250)*	Two 7.50-16; 6; 36 *(250)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	25 lb *(11 kg)*	None
Height of Drawbar		19.5 in *(495 mm)*	19.5 in *(495 mm)*
Static Weight with Operator	—Rear	5835 lb *(2647 kg)*	3450 lb *(1565 kg)*
	—Front	1950 lb *(884 kg)*	1900 lb *(862 kg)*
	—Total	7785 lb *(3531 kg)*	5350 lb *(2427 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 136°F *(57.9°C)*. Four gears were chosen between 15% slip and 10 mph *(16.1 km/h)*.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1506.**

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers

John Deere 1650 Diesel

The Agricultural Experiment Station
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Irvin T. Omtvedt, Dean and Director

Nebraska Tractor Tests Summarized (Tests from 1973 through 1983)

						ENGINE									-FUEL CONSUMPTION (HP Hours Per Gallon) @:-				
																	-Varying Drawbar Power-		
MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	No. of Cylinders	Bore and Stroke	Displacement Cu. In.	Rated RPM Dwbr.	Max. PTO HP @ Rated Engine RPM	Std. PTO RPM	Max. PTO HP @ Std. PTO RPM	Max. Drawbar HP	MPH @ Max. Dwbr. HP	Max. Lbs. Pull	Max. PTO HP @ Std. PTO RPM	PTO Average @ Varying Power	Max. Available Power	75% of Pull Max. Power	50% of Pull @ Max. Power
Allis-Chalmers																			
175	1156	Gas	8400	2010	4	4.000x4.500	226	1800	60.88	540	56.02	53.17	5.50	6875	11.78	9.44	10.22	9.64	8.20
5020	1270	Die.	3358	1298	2	3.62x3.74	77	2500	21.79	540	20.78	18.05	5.74	2346	13.99	10.99	11.07	10.51	8.62
5030	1271	Die.	3876	1346	2	3.82x3.94	90.1	2500	26.42	540	25.61	23.92	4.26	3389	13.82	11.28	11.64	11.48	9.68
5040	1230	Die.	6240	2180	3	3.740x4.330	143	2400	40.05	540	36.69	35.86	5.00	4837	15.47	11.80	12.58	12.74	10.44
5050 Diesel	1240	Die.	7690	3280	3	4.055x4.330	168	2700	51.46	540	47.16	45.22	5.68	6075	16.10	12.42	12.58	13.01	11.24
6060 8 Speed	1397	Die.	8945	2480	4	3.876x4.250	200	2300	63.83	540	64.90	52.24	4.83	6846	16.26	12.07	13.27	11.99	10.10
6080 12 Speed	1398	Die.	11790	4200	4	3.876x4.25	200	2300	83.66	1000	74.49	72.32	5.74	9003	15.70	13.14	14.27	12.81	10.93
6140 Diesel	1445	Die.	6195	1735	3	3.858x4.055	142	2500	41.08	541	38.04	33.97	5.20	4768	13.47	10.20	10.87	10.25	8.88
7000PS Diesel	1195	Die.	12580	3030	6	3.875x4.250	301	2200	106.44	1000	105.85	92.64	6.08	9907	15.70	12.21	13.21	12.27	10.16
7010PD Die. 20 Speed	1345	Die.	12790	1530	6	3.875x4.25	301	2300	106.53	1000	107.52	91.44	6.05	9426	15.48	11.57	12.59	11.48	9.68
7010PS Die. 12 Speed	1346	Die.	12740	1365	6	3.875x4.25	301	2300	106.72	1000	106.33	91.61	6.11	9516	15.43	11.74	12.43	11.35	9.58
7020 Power Shift	1259	Die.	15610	3840	6	3.875x4.250	301	2300	123.79	1000	123.50	105.36	6.59	12001	16.01	12.45	13.10	12.25	10.34
7020 Power Director	1260	Die.	15655	4085	6	3.875x4.250	301	2300	123.85	1000	125.51	107.36	6.63	11964	16.08	12.12	13.09	12.08	10.13
7030 Diesel	1119	Die.	16560	4130	6	4.250x5.000	426	2300	130.98	1000	131.14	113.28	4.94	12610	15.45	11.76	12.92	11.90	9.91
7040 Diesel	1166	Die.	17380	5585	6	4.250x5.000	426	2300	136.49	1000	136.26	117.12	4.77	13619	15.35	11.78	12.94	11.86	9.80
7040PS Diesel	1196	Die.	17355	4977	6	4.250x5.000	426	2300	136.30	1000	136.15	117.75	4.61	13547	15.51	11.95	13.05	12.29	10.39
7045 Power Director	1261	Die.	18980	4745	6	4.250x5.000	426	2300	146.18	1000	146.46	127.84	7.04	15430	14.62	11.26	12.16	11.40	9.72
7045 Powershift Diesel	1308	Die.	18990	4390	6	4.25x5.00	426	2300	146.88	1000	146.67	127.61	6.92	15449	14.92	11.32	12.58	11.71	9.62
7050 Diesel	1120	Die.	19530	5005	6	4.250x5.000	426	2300	156.49	1000	156.63	135.11	5.47	16206	16.04	12.69	13.47	12.67	10.53
7060 Diesel	1167	Die.	20430	6500	6	4.250x5.000	426	2300	161.51	1000	160.44	140.59	6.94	17370	15.99	12.71	13.63	12.75	10.55
7060PS Diesel	1197	Die.	20560	5915	6	4.250x5.000	426	2300	161.42	1000	161.65	144.13	4.92	17851	16.08	12.76	13.80	12.98	10.79
7080 Diesel	1168	Die.	21720	7115	6	4.250x5.000	426	2550	181.51	996	181.51	153.78	4.58	18478	15.71	12.24	13.23	12.11	10.02
7580 4WD	1229	Die.	25000	1490	6	4.250x5.000	426	2550	186.35	996	186.35	160.79	6.91	23310	14.81	11.47	12.22	11.39	9.40
8010 Powershift	1446	Die.	13185	555	6	3.875x4.25	301	2300	107.38	1000	109.55	93.01	6.16	9102	15.01	11.49	12.57	11.48	9.54
8030 Powershift	1447	Die.	17100	2085	6	4.25x5.00	426	2300	133.75	1000	134.42	116.65	6.35	13348	15.25	11.78	12.93	11.87	10.00
8050 Powershift	1448	Die.	19380	4075	6	4.25x5.00	426	2300	152.40	1000	155.15	134.13	4.89	16728	15.88	12.51	13.71	12.73	10.80
8070 Powershift	1449	Die.	22370	5520	6	4.25x5.00	426	2400	170.72	1000	171.44	147.29	5.87	18777	16.48	12.81	13.67	12.59	10.64
8550 Diesel	1262	Die.	29360	2320	6	5.250x5.625	731	2500	253.88	998	253.88	224.18	5.83	26220	14.57	10.94	12.47	11.45	9.35
Belarus																			
MTZ 80 Diesel	1139	Die.	11575	3735	4	4.331x4.921	290	2200	74.79	1000	73.88	65.64	5.08	8141	15.30	13.07	13.12	13.12	11.32
250 Diesel	1183	Die.	5490	939	2	4.134x4.724	127	1800	24.95	540	25.02	21.81	4.54	2280	15.56	13.23	13.19	13.20	11.80
T25A Diesel	1200	Die.	5490	939	2	4.134x4.724	127	1800	28.70	540	28.15	24.46	4.51	2570	13.95	13.46	12.21	13.48	11.94
1500 Diesel 12 Speed	1333	Die.	19885	1120	6	5.118x4.528	558	2100	168.76	1000	169.63	151.96	5.31	19311	16.48	13.69	14.53	13.98	12.25
7100 Diesel 16 Speed	1334	Die.	32460	None	12	5.118x5.512	1360	1900	269.62	1003	269.62	259.46	4.78	30845	15.85	13.26	14.82	14.35	12.56
Big Bud																			
525/50 9 Speed	1400	Die.	51920	None	6	6.25x6.25	1150	2100	....	....	....	421.49	5.64	42216	....	....	14.87	13.97	12.01
David Brown																			
885 Gasoline	1143	Gas.	6550	2530	3	3.939x4.000	146.1	2200	39.26	1000†	37.26	32.92	4.61	5308	10.96	8.19	7.55	7.00	7.21
885 Diesel	1137	Die.	6480	2125	3	3.939x4.500	164.4	2200	43.20	1000†	40.87	37.16	4.57	5135	16.61	14.03	13.85	13.73	12.67
990 Diesel	1144	Die.	9350	4690	4	3.939x4.000	194.9	2200	53.77	1000†	50.48	46.34	5.54	7335	15.53	13.23	13.37	12.91	11.14
995 Diesel	1136	Die.	9475	4325	4	3.939x4.500	219	2200	58.77	1000†	55.33	50.42	5.44	7317	16.60	13.94	13.78	13.60	12.40
1210 Diesel	1142	Die.	10440	4640	4	3.939x4.500	219	2300	65.98	1000†	59.40	57.23	6.16	8097	16.40	14.43	13.61	14.36	12.93
1212 Diesel	1138	Die.	10435	4030	4	3.939x4.500	219	2300	65.36	1000†	58.25	54.10	6.92	8137	15.35	13.84	12.56	13.27	11.82
Case																			
870 Manual Diesel	1149	Die.	13510	3435	4	4.625x5.000	336	2100	80.20	1000	77.93	71.09	5.23	10047	14.52	12.13	12.42	12.53	10.88
870 Power Shift	1150	Die.	13760	3665	4	4.625x5.000	336	2100	80.49	1000	76.52	71.04	4.39	10030	13.64	11.60	11.49	12.04	10.60
1190 Manual	1378	Die.	6780	2160	3	3.939x4.500	165	2200	43.09	540	38.54	36.60	7.60	4620	14.99	13.09	12.22	12.59	11.39
1270	1160	Die.	18910	3440	6	4.375x5.000	451	2100	135.39	1000	135.41	121.83	6.46	15648	14.23	11.14	12.16	11.49	9.88
1290 Manual	1379	Die.	9320	2750	4	3.939x4.000	195	2200	53.73	540	47.80	46.41	4.97	6851	15.20	13.34	12.41	12.90	11.68

1370 Diesel	1148	Die.	20290	4945	6	4.625x5.000	504	2200	155.56	1000	156.32	134.25	5.00	16480	15.01	10.95	12.04	10.91	9.11
1390 Manual	1380	Die.	9780	3160	4	3.939x4.500	219	2200	60.59	1000	58.40	52.16	4.92	7348	15.58	13.36	12.89	13.24	11.77
1410 Manual	1209	Die.	10910	3160	4	3.939x4.500	219	2300	80.88	540	79.35	69.25	5.32	7846	17.47	14.69	14.20	14.38	12.45
1410 Powershift	1210	Die.	10990	3150	4	3.939x4.500	219	2300	80.61	540	76.21	67.98	7.90	7815	16.86	13.76	13.34	13.21	11.45
1490 Manual	1381	Die.	11305	3600	4	3.939x4.500	219	2200	70.51	1000	68.75	60.45	5.63	8340	17.18	13.62	13.82	13.00	11.25
1490 Powershift	1382	Die.	11060	2635	4	3.939x4.500	219	2200	70.91	1000	70.48	61.56	6.76	8405	16.42	12.36	13.12	12.01	10.20
1570	1218	Die.	20350	4060	6	4.625x5.000	504	2100	180.41	1003	180.41	152.96	5.02	17115	15.09	12.47	12.72	12.46	10.99
1690 Manual (1)	1383	Die.	12470	3715	6	3.939x4.500	329	2300	90.39	1000	87.76	78.08	4.27	10536	15.95	13.95	13.20	13.50	12.28
2090 Manual Diesel	1304	Die.	15030	3120	6	4.625x5.000	504	2100	108.74	998	108.74	95.31	7.10	11655	15.40	12.23	13.41	12.69	10.73
2090 Power Shift	1295	Die.	15190	3160	6	4.625x5.00	504	2100	108.29	998	108.29	93.95	6.56	11211	14.94	11.77	12.49	11.96	10.14
2290 Manual Diesel	1296	Die.	15400	2630	6	4.625x5.000	504	2100	128.80	998	128.80	109.36	5.32	12635	14.52	11.66	12.46	11.73	10.07
2290 Powershift Diesel	1297	Die.	15840	2140	6	4.625x5.000	504	2100	129.08	998	129.08	111.68	6.25	12749	14.52	11.53	12.65	11.37	9.77
2390 Powershift Diesel	1302	Die.	18710	3120	6	4.625x5.000	504	2100	160.72	1002	160.72	146.01	6.59	16020	15.23	12.41	13.20	12.66	10.88
2590 Powershift Diesel	1303	Die.	20500	4760	6	4.625x5.000	504	2100	180.38	1003	180.38	159.01	6.57	17865	15.53	12.97	13.42	13.03	11.67
2670 Diesel	1165	Die.	25260	4450	6	4.625x5.000	504	2200	219.44	1008	219.44	194.60	5.28	23618	15.29	12.59	13.42	12.60	10.88
2870 Diesel	1241	Die.	28150	3050	6	5.000x5.710	673	2200	252.10	1009	252.10	219.61	5.72	26386	15.45	12.01	12.98	12.37	10.40
M-B 4/94	1211	Die.	13110	4620	6	3.819x5.039	346	2550	73.33	1000†	70.17	66.33	5.33	10558	15.13	10.68	12.55	11.65	9.49
4490 Diesel	1328	Die.	22450	1610	6	4.625x5.000	504	2200	175.20	1000	175.20	153.30	5.65	21400	15.27	12.36	13.30	12.52	10.87
4690 Diesel	1329	Die.	25230	2920	6	4.625x5.000	504	2200	219.62	1000	219.62	195.60	5.97	24564	15.26	12.76	13.39	12.84	11.21
4890 Diesel	1330	Die.	28460	2710	6	5.00x5.71	673	2200	253.41	1000	253.41	224.81	5.96	27627	16.32	13.02	14.19	13.27	11.36

(1) With mechanical front wheel drive.

John Deere

750 8 Speed	1504	Die.	2150	155	3	3.15x3.35	78.2	2400	18.54	540	19.80	15.73	6.41	1661	15.06	11.61	12.48	11.53	9.83
830 Diesel	1146	Die.	5714	1338	3	3.860x4.330	152	2400	35.30	540	32.62	28.46	5.19	4252	14.74	11.37	11.84	11.03	9.09
850	1280	Die.	3528	992	3	3.15x3.35	78	2600	22.27	540	20.66	18.92	4.90	2699	14.26	11.51	11.23	11.22	10.21
950	1281	Die.	3615	803	3	3.54x3.54	105	2400	27.36	540	28.05	23.46	4.98	3056	14.68	12.36	12.42	12.23	10.63
1050 Diesel	1327	Die.	4140	730	3	3.54x3.54	105	2400	33.41	540	33.42	28.15	5.27	3466	15.56	12.36	12.34	11.99	10.13
1250 Diesel	1437	Die.	5180	90	3	3.74x4.33	143	2500	40.70	540	40.98	34.01	5.39	3750	17.00	13.56	13.90	12.71	10.68
1450 9 Speed	1505	Die.	6570	1340	4	3.74x4.33	190	2400	51.39	540	50.93	43.79	7.68	5321	17.60	14.01	14.74	13.67	11.64
1530 Diesel	1147	Die.	6863	1909	3	4.020x4.330	164	2500	45.38	540	41.36	38.86	5.58	5139	14.28	11.20	12.04	11.47	9.78
1650 9 Speed	1506	Die.	7785	2435	4	3.74x4.33	190	2300	62.22	540	62.70	54.06	7.79	6572	18.81	15.53	15.96	14.97	12.95
2040 Diesel	1191	Die.	6420	1620	3	4.020x4.330	164	2500	40.86	540	37.62	34.15	5.64	4634	15.50	11.18	11.87	11.15	9.51
2040 Diesel 8 Speed	1350	Die.	6500	1465	3	4.19x4.33	179	2500	41.25	540	40.53	33.31	5.63	4873	15.62	11.73	12.02	11.35	9.03
2040 8 Speed TSS (1)	1393	Die.	6040	265	3	4.19x4.33	179	2500	40.44	540	40.22	33.21	5.16	5541	14.87	10.93	11.69	10.71	8.76
2150 16 Speed	1469	Die.	5930	820	3	4.19x4.33	179	2500	46.47	540	46.13	38.69	6.98	4875	14.77	11.15	11.88	11.24	9.47
2240 Diesel	1192	Die.	7340	2390	3	4.190x4.330	179	2500	50.37	540	46.78	41.28	5.54	5433	15.20	11.08	11.57	11.18	9.51
2240 8 Speed TSS (1)	1394	Die.	6205	310	3	4.19x4.33	179	2500	50.90	540	49.20	42.13	5.08	5777	15.32	11.75	11.98	11.45	9.78
2350 16 Speed	1470	Die.	7190	380	4	4.19x4.33	239	2500	56.18	540	55.69	47.53	6.77	5688	15.67	11.66	12.96	11.87	9.87
2550 16 Speed	1471	Die.	8485	1575	4	4.19x4.33	239	2500	65.94	540	65.53	56.24	6.22	6979	15.42	11.85	12.83	12.09	10.10
2630	1157	Die.	8430	2630	4	4.190x5.000	276	2500	70.37	540	69.02	58.15	5.38	6470	16.01	10.89	12.10	10.98	8.95
2750 16 Speed	1472	Die.	9625	2125	4	4.19x4.33	239	2500	75.35	540	75.07	63.98	4.75	7581	16.11	12.29	13.13	12.37	10.51
2840 Diesel	1249	Die.	10500	1695	6	4.020x4.330	329	2500	80.65	1000	76.27	67.47	6.21	8386	16.02	11.52	12.36	11.57	9.59
2940 Diesel 16 Speed	1351	Die.	10650	1215	6	4.19x4.33	359	2500	81.17	1000	81.46	67.98	4.64	7601	15.91	11.73	12.81	11.91	9.91
2950 16 Speed	1473	Die.	11045	945	6	4.19x4.33	359	2500	85.37	1000	85.50	73.30	6.57	8768	16.33	12.21	13.58	12.45	10.53
4040 Diesel	1267	Die.	12055	1165	6	4.250x4.750	404	2200	90.30	1002	90.80	77.85	6.36	8936	13.49	10.59	11.24	10.96	9.21
4040 Syncro Range	1359	Die.	12090	1600	6	4.25x4.75	404	2200	90.31	1002	90.31	77.04	8.14	9035	13.87	10.85	11.68	11.29	9.70
4040 Power Shift	1360	Die.	12080	1590	6	4.25x4.75	404	2200	90.79	1000	90.88	78.54	4.45	9195	13.54	10.79	11.50	11.35	9.55
4050 Quad	1474	Die.	13005	835	6	4.57x4.75	466	2200	101.49	1000	101.49	92.05	6.49	10331	15.12	11.72	13.44	12.54	10.64
4050 Powershift	1457	Die.	13030	310	6	4.57x4.75	466	2200	100.95	1000	100.95	88.75	7.88	11058	15.08	11.59	13.24	11.69	9.65
4240 Diesel	1266	Die.	14090	1695	6	4.5625x4.75	466	2200	110.94	1002	110.94	95.18	5.42	11492	14.33	11.09	12.05	11.35	9.52
4240 Syncro Range	1361	Die.	14240	2430	6	4.56x4.75	466	2200	110.81	1002	110.81	95.40	4.90	12240	14.17	11.08	12.00	11.47	9.81
4240 Power Shift	1362	Die.	14260	2440	6	4.56x4.75	466	2200	111.06	1000	111.43	95.65	4.51	12450	14.39	11.25	12.13	11.65	10.13
4250 Quad	1475	Die.	14990	1620	6	4.57x4.75	466	2200	120.21	1000	120.21	110.90	5.15	12858	15.70	12.21	13.90	12.82	10.64
4250 Powershift	1458	Die.	14970	1115	6	4.57x4.75	466	2200	120.86	1000	120.86	107.71	7.56	12802	15.78	12.33	13.81	12.08	10.17
4440 Diesel	1265	Die.	15540	2270	6	4.5625x4.75	466	2200	130.58	1002	130.58	112.56	5.02	13392	15.21	11.73	12.69	11.83	9.90
4440 Pwr Shift	1357	Die.	15775	2655	6	4.56x4.75	466	2200	130.41	1010	130.41	114.16	4.53	13738	15.32	11.83	13.15	12.22	10.60
4450 Quad	1476	Die.	16680	2380	6	4.57x4.75	466	2200	140.33	1000	140.33	125.18	5.01	15069	16.36	13.08	14.42	13.45	11.61
4450 Quad (2)	1476	Die.	16760	2005	6	4.57x4.75	466	2200	140.33	1000	140.33	128.68	4.86	16278	16.36	13.08	14.68	....	....
4450 Powershift	1459	Die.	16745	1795	6	4.57x4.75	466	2200	140.43	1000	140.43	121.94	8.03	15014	16.15	12.94	13.63	12.58	10.60
4450 Powershift (2)	1459	Die.	16625	1225	6	4.57x4.75	466	2200	140.43	1000	140.43	128.10	7.78	16154	16.15	12.94	14.55	....	....
4640 Diesel	1264	Die.	18120	None	6	4.5625x4.75	466	2200	156.30	998	156.30	134.70	6.45	15362	15.61	12.29	13.30	12.15	10.32
4640 Power Shift	1358	Die.	18585	2805	6	4.56x4.75	466	2200	155.96	1000	157.01	137.04	4.81	15989	15.87	12.17	13.53	12.55	10.78
4650 Quad	1477	Die.	19615	1615	6	4.57x4.75	466	2200	165.70	1000	165.70	145.58	6.45	16814	16.99	13.90	14.80	13.81	12.11

Nebraska Tractor Tests Summarized (Tests from 1973 through 1983)

						ENGINE									-FUEL CONSUMPTION (HP Hours Per Gallon) @:-		-Varying Drawbar Power-		
MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	No. of Cyl-inders	Bore and Stroke	Dis-place-ment Cu. In.	Rated RPM Dwbr.	Max. PTO HP @ Rated Engine RPM	Std. PTO RPM	Max. PTO HP @ Std. PTO RPM	Max. Draw-bar HP	MPH @ Max. Dwbr. HP	Max. Lbs. Pull	Max. PTO HP @ Std. PTO RPM	PTO Average @ Varying Power	Max. Avail-able Power	75% of Pull Max. Power	50% of Pull @ Max. Power
John Deere Cont.																			
4650 Quad (2)	1477	Die.	19590	1150	6	4.57x4.75	466	2200	165.70	1000	165.70	148.33	5.19	18931	16.99	13.90	14.93	....	....
4650 Powershift	1460	Die.	19660	1075	6	4.57x4.75	466	2200	165.52	1000	165.52	143.33	8.12	16746	16.96	13.78	14.25	13.15	11.31
4650 Powershift (2)	1460	Die.	19740	695	6	4.57x4.75	466	2200	165.52	1000	165.52	146.01	8.47	18794	16.96	13.78	15.12	....	....
4840 Diesel	1263	Die.	20370	2240	6	4.5625x4.75	466	2200	180.63	1000	181.63	157.09	4.76	17307	15.85	12.47	13.35	12.54	10.76
4850 Powershift	1461	Die.	21435	2715	6	4.57x4.75	466	2200	192.99	1000	192.99	171.27	8.04	18789	17.47	14.50	14.68	13.80	12.01
4850 Powershift (2)	1461	Die.	21440	2280	6	4.57x4.75	466	2200	192.99	1000	192.99	179.63	7.67	20810	17.47	14.50	16.15	....	....
8430 Diesel	1179	Die.	23100	290	6	4.563x4.750	466	2100	178.16	993	178.16	160.39	5.56	22503	15.12	11.98	13.44	12.64	10.72
8440 Diesel	1323	Die.	26590	None	6	4.563x4.75	466	2100	179.83	993	179.83	163.26	4.97	25383	15.86	12.55	14.29	13.06	11.25
8450 Diesel	1436	Die.	29150	None	6	4.5625x4.75	466	2100	186.98	993	186.98	175.73	4.50	26567	15.69	12.91	14.45	13.53	11.63
8630 Diesel	1180	Die.	26480	1950	6	5.125x5.000	619	2100	225.59	993	225.59	202.31	4.58	26443	15.34	12.27	13.67	12.80	10.78
8640 Diesel	1324	Die.	28270	None	6	5.125x5.00	619	2100	228.75	993	228.75	208.38	4.63	27782	15.61	12.40	14.06	13.14	11.16
8650 Diesel	1435	Die.	30270	None	6	5.125x5.00	619	2100	238.56	993	238.56	221.80	5.55	28257	15.53	12.65	14.26	13.22	11.52
8850 Diesel	1434	Die.	37700	None	8	5.51x5.00	955	2100	303.99	996	303.99	274.91	6.59	35330	15.74	12.82	14.06	13.34	11.65
(1) With mechanical front wheel drive. (2) Supplementary test with radial ply tires.																			
Deutz																			
D4506	1131	Die.	7390	2880	3	3.940x4.720	172.5	2300	43.15	540	42.17	37.07	4.68	5472	18.01	14.12	14.49	14.05	12.46
D6206	1219	Die.	8780	3410	4	3.937x4.724	230	2050	60.23	540	57.00	52.41	6.04	6944	17.58	15.43	15.10	15.34	14.05
D6806	1220	Die.	11000	4605	4	3.937x4.724	230	2300	68.18	540	62 52	61.87	7.15	9095	16.55	14.73	14.63	15.05	13.52
D13006	1130	Die.	16125	4075	6	3.940x4.720	345	2400	125.77	1000	126.19	110.24	5.74	13509	17.71	14.00	14.97	13.83	11.95
DX-90 Diesel	1305	Die.	13150	3210	5	3.94x4.72	287	2300	84.47	1000	80.82	74.19	6.53	8786	16.45	14.15	13.81	14.07	12.39
DX-110 Diesel	1306	Die.	14940	2360	6	3.94x4.72	345	2300	100.29	1000	93.61	90.82	7.00	11773	15.10	13.71	13.52	14.03	12.60
DX-120	1405	Die.	14950	1980	6	4.02x4.92	374	2400	111.29	1000	101.90	97.41	7.32	12615	16.40	13.84	13.59	13.48	12.03
DX-130	1404	Die.	17630	3690	6	4.02x4.92	374	2300	121.27	1000	121.36	105.63	4.76	14406	17.63	13.77	14.14	13.10	11.26
DX-160 Diesel	1307	Die.	18710	3870	6	4.02x4.92	374	2200	145.41	1000	140.99	124.81	6.41	15172	17.82	14.47	14.56	13.95	11.93
Fiat																			
420	1293	Die.	6035	2115.	3	3.74x4.33	143	2200	41.34	540	37.45	37.71	5.65	5299	14.81	12.93	13.30	13.92	12.35
580	1292	Die.	9210	2580	3	4.055x4.33	168	2700	51.61	540	48.42	44.20	3.38	8899	14.93	12.59	12.14	12.70	10.50
780	1294	Die.	10230	2830	4	4.055x4.33	224	2500	70.36	540	66.30	64.43	4.06	7776	15.41	13.62	13.93	14.17	12.30
Ford																			
1510 (12x4) Manual	1500	Die.	3205	975	3	3.03x3.15	68.2	2800	19.72	540	20.45	16.99	6.92	1952	13.21	10.32	11.14	10.26	8.50
1510 (12x4) Synchro	1501	Die.	3200	915	3	3.03x3.15	68.2	2800	19.98	540	18.68	16.83	6.70	1900	13.50	10.29	10.97	10.27	8.57
1600 Diesel	1228	Die.	3840	1150	2	3.543x3.937	77.6	2500	23.02	540	19.78	18.53	5.76	2634	14.14	11.82	11.26	11.45	9.72
1700 Diesel	1325	Die.	3725	1110	2	3.54x3.94	77.6	2500	23.26	540	23.02	20.21	5.54	2801	13.02	11.21	10.89	11.48	10.41
1710 (12x4) Manual	1502	Die.	3510	1040	3	3.31x3.31	85.2	2700	23.88	540	22.19	21.02	7.06	2700	13.42	10.16	11.36	10.76	8.98
1710 (12x4) Synchro	1503	Die.	3530	1060	3	3.31x3.31	85.2	2700	23.79	540	22.34	21.23	5.68	2680	13.18	9.92	11.04	10.56	8.81
1900 Diesel	1326	Die.	4160	1225	3	3.35x3.31	87.2	2800	26.88	540	25.68	23.49	6.20	2964	12.58	10.38	10.41	10.89	9.32
2600 6-Speed	1204	Die.	5990	1550	3	4.200x3.800	158	2000	32.38	540	30.51	27.93	5.57	4591	14.88	11.51	12.27	11.74	10.22
2600 6-Speed	1206	Gas.	6000	1645	3	4.200x3.800	158	2000	32.78	540	31.03	28.25	5.57	4198	11.14	7.89	8.83	8.17	6.73
2600 8-Speed	1222	Die.	6000	460	3	4.200x3.800	158	2000	32.47	540	30.76	28.18	5.56	4452	14.62	11.18	11.94	11.22	9.18
2600 8-Speed	1207	Gas.	6000	1710	3	4.200x3.800	158	2000	34.18	540	32.07	30.20	5.49	4455	11.54	8.38	9.45	8.64	7.15
2610 (8x2)	1421	Die.	5940	1780	3	4.2x4.2	175	2000	36.69	540	35.14	31.45	5.52	4473	16.15	12.82	13.03	12.71	10.51
2910 (8x2)	1491	Die.	5925	1295	3	4.20x4.20	175	2000	36.62	540	35.09	30.45	5.77	4237	16.04	12.51	13.18	12.31	11.95
2910 (8x4)	1492	Die.	5955	1305	3	4.20x4.20	175	2000	36.40	540	34.75	31.03	5.68	4223	15.95	12.58	13.00	12.24	10.59
3600 6-Speed	1203	Die.	6860	2445	3	4.200x4.200	175	2000	40.49	540	37.64	34.47	5.96	5114	15.32	12.12	12.84	12.34	9.97
3600 6-Speed	1208	Gas.	6900	2665	3	4.200x4.200	175	2000	40.17	540	37.91	35.53	5.91	5158	11.23	8.07	9.29	8.77	7.05
3600 8-Speed	1221	Die.	6890	1300	3	4.200x4.200	175	2000	40.55	540	38.31	34.10	5.96	5277	15.33	12.40	12.93	12.51	10.36
3600 8-Speed	1226	Gas.	6900	1500	3	4.200x4.200	175	2000	40.62	540	38.29	35.90	5.93	5123	11.42	8.16	9.02	8.57	6.88
3610 (8x2)	1422	Die.	6340	2070	3	4.4x4.2	192	2000	42.26	540	40.17	36.80	5.85	4964	15.95	12.65	13.37	12.69	11.20
3610 (8x4)	1423	Die.	6340	2045	3	4.4x4.2	192	2000	42.47	540	40.01	35.57	8.55	4917	16.26	12.94	12.85	12.44	10.53
3910 (8x2)	1493	Die.	6440	1760	3	4.40x4.20	192	2000	42.62	540	40.39	37.02	5.93	4931	15.86	12.48	13.33	12.66	10.71

3910 (8x4)	1494	Die.	6435	1735	3	4.40x4.20	192	2000	42.67	540	41.16	36.22	5.85	4934	15.64	12.63	13.16	12.34	10.59
4100 8-Speed	1202	Die.	7500	2590	3	4.200x4.400	183	2000	45.46	540	41.13	41.14	4.63	5557	15.59	11.57	12.57	11.96	10.36
4110 (8x2)	1424	Die.	7500	2850	3	4.4x4.4	201	2200	48.33	540	42.65	41.25	4.51	5681	16.37	12.64	13.26	12.34	10.76
4110 (8x4)	1425	Die.	7500	2785	3	4.4x4.4	201	2200	49.26	540	44.06	40.59	4.92	5691	16.06	12.32	12.92	12.13	10.44
4600 8-Speed	1223	Die.	8220	2340	3	4.400x4.400	201	2200	52.44	540	46.31	45.57	5.24	6342	14.59	11.49	11.82	11.85	10.77
4610 (8x2)	1426	Die.	8190	3095	3	4.4x4.4	201	2200	52.52	540	46.72	44.51	5.17	6402	16.78	13.17	13.96	13.25	11.60
4610 (8x4)	1427	Die.	8230	3085	3	4.4x4.4	201	2200	52.32	540	47.30	43.26	5.62	6534	16.83	13.05	13.53	12.77	11.18
5600 8-Speed	1201	Die.	9690	3785	4	4.200x4.200	233	2100	60.46	540	56.85	52.22	5.49	7105	15.77	12.83	12.87	12.88	11.02
5600 16-Speed	1227	Die.	9690	2380	4	4.200x4.200	233	2100	58.46	540	56.00	49.79	5.36	7140	15.06	11.94	12.07	11.94	10.42
5610 (16x4)	1428	Die.	9700	2325	4	4.4x4.2	256	2100	62.54	540	60.58	54.63	5.69	7408	15.57	12.38	12.82	12.44	10.30
5610 (16x8)	1429	Die.	9545	3130	4	4.4x4.2	256	2100	62.57	540	59.99	53.70	6.57	7578	15.45	12.11	12.93	12.03	10.09
6600 8-Speed	1217	Die.	9660	3780	4	4.400x4.200	256	2100	70.56	1000	70.07	61.36	6.91	7131	15.43	12.86	12.28	12.71	11.36
6600 16-Speed	1224	Die.	9700	2680	4	4.400x4.200	256	2100	68.10	1000	68.05	58.74	5.22	7267	14.97	12.64	12.05	12.77	11.05
6610 (16x4)	1430	Die.	9700	2270	4	4.4x4.4	268	2100	72.13	540	68.27	61.17	5.62	7887	15.64	13.14	13.40	12.90	10.77
6610 (16x8)	1431	Die.	9700	2850	4	4.4x4.4	268	2100	7230	540	69.20	62.64	6.49	7948	15.43	12.91	13.18	12.84	10.87
6700 16-Speed	1244	Die.	9690	1180	4	4.400x4.200	255	2100	68.94	1000	68.62	58.06	7.55	6787	13.77	12.23	11.24	12.38	11.16
7600 16-Speed	1225	Die.	10760	3320	4	4.400x4.200	256	2100	84.79	1000	85.16	67.95	5.61	7779	15.95	12.35	12.44	11.77	9.92
7610 (16x4)	1432	Die.	10800	2220	4	4.4x4.4	268	2100	86.95	1000	86.79	74.22	5.53	8804	15.75	12.44	13.36	12.29	10.35
7710 (16x8)	1433	Die.	10800	2150	4	4.4x4.4	268	2100	86.62	1000	86.55	73.24	6.42	8638	15.87	12.60	13.67	12.26	10.35
7700 16-Speed	1242	Die.	10800	2400	4	4.400x4.200	255	2100	84.38	1000	84.29	71.57	7.28	7688	15.24	11.65	11.92	11.21	9.71
8700 16-Speed	1245	Die.	14760	2490	6	4.400x4.400	401	2300	110.58	1000	99.56	100.12	6.94	11581	15.02	11.91	12.37	12.28	10.93
8600 Dual Power	1121	Die.	14790	3360	6	4.400x4.400	401	2300	110.69	1000	99.32	93.26	4.88	11363	15.69	12.84	12.71	12.74	11.19
9600 Dual Power	1122	Die.	18000	6140	6	4.400x4.400	401	2200	135.46	1000	128.46	116.40	6.65	12203	16.88	12.99	13.31	12.64	11.06
9700 16-Speed	1243	Die.	17480	4620	6	4.40x4.400	401	2200	135.64	1000	129.25	118.08	6.55	15010	15.95	11.77	12.63	11.97	10.34
TW-10 Diesel	1301	Die.	15190	2325	6	4.4x4.4	401	2300	110.24	1000	101.09	97.35	5.23	12006	14.86	11.50	12.17	11.91	10.20
TW-20 Diesel	1300	Die.	17180	3945	6	4.4x4.4	401	2200	135.60	1000	131.43	121.47	7.85	14155	16.22	11.78	13.08	12.04	10.09
TW-30 Diesel	1299	Die.	19830	5205	6	4.4x4.4	401	2200	163.28	1000	157.04	144.17	8.32	16553	16.76	12.49	13.67	12.58	10.79
FW-20	1291	Die.	31000	1385	8	4.625x4.125	555	2850	....	....	....	156.85	5.45	27155	....	....	12.12	11.69	10.15
FW-30	1288	Die.	31720	410	8	5.500x4.750	903	2600	(1)	....	....	212.02	6.64	27803	....	....	13.71	12.24	10.08
				FW 30 without PTO								220.38	5.85	28302	....	....	14.16	12.73	10.96
FW40	1290	Die.	32950	2320	8	5.500x4.750	903	2600	....	....	....	238.78	6.60	28245	....	....	13.83	12.84	10.73
FW60	1289	Die.	33970	2870	8	5.500x4.750	903	2600	....	....	....	285.57	7.45	29304	....	....	14.90	13.38	11.27

(1) Equipped with controlled, hydrostatic pto with 105 output horsepower at 1000 rpm. (2) Drawbar information is from test run with radial ply tires.

Hesston Fiat

466 12 Speed	1484	Die.	6670	950	3	3.94x4.33	158	2600	45.13	540	42.68	40.03	5.79	(1)	16.74	12.41	13.66	12.87	10.95
480-8 DT and 480-8 12 & 8 Speed	1385	Die.	7805	2485	3	3.937x4.33	158	2600	42.58	540	40.36	37.07	5.07	5265	16.93	12.27	13.34	12.54	10.64
666 12 Speed	1485	Die.	8715	2425	4	3.94x4.33	211	2500	62.40	540	60.33	54.31	5.51	(2)	17.00	13.00	13.79	13.20	11.73
680DT & 680 8 Speed	1352	Die.	10000	2660	4	3.937x4.331	211	2500	62.47	1000	61.20	53.65	5.44	6252	17.40	14.19	14.80	14.20	12.45
780 DT and 780 8-Speed	1386	Die.	10100	3920	4	4.055x4.33	224	2500	70.57	540	66.67	62.06	7.61	6965	16.71	13.96	13.72	13.86	12.26
880 DT-5 & 880-5 12 Speed	1353	Die.	11560	2810	5	4.055x4.331	280	2500	81.32	1000	80.95	70.73	7.63	7554	16.27	13.23	13.50	13.44	11.65
980DT & 980 16 Speed	1354	Die.	12645	3795	6	3.937x4.33	316	2400	91.12	996	9112	77.42	5.00	8351	16.90	13.92	14.25	13.59	12.25
1180 DT Turbo	1450	Die.	16885	1935	6	4.055x4.33	335	2550	107.48	1000	104.22	93.71	4.37	12905	16.40	12.54	14.16	12.74	10.42
1380DT, 1380	1409	Die.	16995	1795	6	4.055x4.33	335	2400	123.16	1000	123.54	104.97	8.08	13105	16.49	13.30	13.60	13.01	11.62
1580DT Turbo	1451	Die.	19060	2460	6	4.528x5.118	494	2200	141.44	1000	136.14	124.15	5.48	15342	17.28	13.49	14.70	13.53	11.47
1880DT, 1880	1410	Die.	19710	3020	6	4.528x5.118	494	2200	162.46	1000	159.83	138.81	5.44	15656	17.36	13.87	14.53	13.58	12.07

(1) 2WD, 4969; 4WD, 5833. (2) 2WD, 6611; 4WD, 7433.

International Harvester

Hydro 70 Gas	1154	Gas	10140	2265	6	3.750x4.390	290.8	2400	69.61	540	64.10	55.09	7.00	8427	11.10	7.17	7.65	6.75	5.48
Hydro 70 Die	1155	Die.	10430	1990	6	3.875x4.410	312	2400	69.51	540	65.41	54.11	7.00	8310	12.40	9.31	9.45	8.76	6.97
Hydro 84 Diesel	1316	Die.	9120	3115	4	3.937x5.062	246	2400	58.73	540	56.68	43.59	7.60	6572	14.01	10.50	10.13	9.82	8.34
Hydro 86 Diesel	1337	Die.	10710	2545	6	3.875x4.375	310	2400	70.89	540	66.64	54.10	4.03	8815	14.18	10.23	9.92	9.55	8.24
Hydro 100	1158	Die.	12765	635	6	4.300x5.000	436	2400	104.17	1000	101.30	82.13	6.42	9801	14.83	10.50	10.35	10.19	8.95
Hydro 186 Diesel	1257	Die.	13430	295	6	4.300x5.000	436	2400	105.02	1000	100.31	82.77	6.56	11312	13.68	10.06	9.83	9.83	8.46
284	1277	Gas.	3596	1166	4	2.756x2.992	71.3	2600	25.75	1000	24.33	20.64	4.02	2561	11.62	9.54	9.77	8.97	7.52
284 8 Speed	1387	Die.	3600	860	3	3.27x3.94	99	2600	27.47	540	23.92	23.52	5.71	2523	14.40	10.91	10.99	10.53	9.18
464 Gas	1126	Gas.	7355	2460	4	3.562x4.390	175	2400	45.74	540	43.64	42.20	4.51	5465	10.80	8.00	9.65	8.86	7.70
464 Diesel	1127	Die.	7570	2440	3	3.875x5.060	179	2400	44.42	540	41.73	39.97	4.53	5488	14.41	11.49	12.25	12.57	10.67
484 Utility Dsl	1312	Die.	7710	2710	3	3.875x5.06	179	2200	42.42	540	41.79	38.06	4.78	5500	14.81	11.85	12.75	12.39	10.63
584 Utility & Rowcrop	1313	Die.	8850	3185	4	3.875x4.38	206	2300	52.54	540	50.96	47.47	5.07	6859	15.23	12.34	13.41	12.95	11.10

Nebraska Tractor Tests Summarized (Tests from 1973 through 1983)

						ENGINE									-FUEL CONSUMPTION (HP Hours Per Gallon) @:-		-Varying Drawbar Power-		
MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	No. of Cylinders	Bore and Stroke	Displacement Cu. in.	Rated RPM Dwbr.	Max. PTO HP @ Rated Engine RPM	Std. PTO RPM	Max. PTO HP @ Std. PTO RPM	Max. Drawbar HP	MPH @ Max. Dwbr. HP	Max. Lbs. Pull	Max. PTO HP @ Std. PTO RPM	PTO Average @ Varying Power	Max. Available Power	75% of Pull Max. Power	50% of Pull @ Max. Power
International Harvester Cont.																			
666 Gas	1152	Gas.	10050	2360	6	3.750x4.390	290.8	2000	66.30	543	66.30	59.31	7.39	7981	11.95	8.45	10.08	9.04	7.27
666 Diesel	1151	Die.	10330	2130	6	3.875x4.410	312	2000	66.29	543	66.29	58.34	5.12	8012	14.24	11.60	12.60	11.98	10.16
674 Utility Gas	1128	Gas.	8330	3035	4	3.812x4.390	200	2400	58.53	540	56.01	53.48	7.04	6583	10.83	8.19	9.40	9.11	8.39
674 Utility Die	1129	Die.	8690	3040	4	3.875x5.060	238.6	2400	61.56	540	58.79	55.91	7.03	6833	15.25	12.16	13.52	13.11	11.31
684 Utility & Rowcrop	1314	Die.	9660	3825	4	3.875x5.06	239	2400	62.52	540	58.75	55.92	5.29	6858	15.55	12.21	13.27	13.02	11.28
686 Diesel (same as 666 Diesel)																			
686 Diesel 10 Speed	1336	Die.	10340	2360	6	3.875x4.375	310	2000	66.36	543	66.36	58.81	5.08	8043	16.07	13.16	13.93	13.27	11.53
784 Rowcrop Diesel	1315	Die.	9920	3830	4	3.937x5.062	246	2400	67.48	1000	64.09	58.65	5.18	8105	16.06	12.75	13.25	12.77	11.07
786 16 Speed	1388	Die.	11930	340	6	3.875x5.0625	358	2400	80.20	1000	77.41	70.25	4.74	9968	15.72	11.40	12.72	11.88	10.00
884 Rowcrop	1376	Die.	10150	3945	4	3.937x5.51	268	2400	72.91	1000	69.76	65.39	5.54	8116	15.76	12.47	13.48	12.91	11.05
886 Diesel	1254	Die.	13040	970	6	3.875x5.085	360	2400	86.14	1000	83.16	76.16	4.70	10485	14.29	10.55	11.77	10.92	9.21
886 Diesel 16 Speed	1338	Die.	13450	1710	6	3.875x5.063	358	2400	86.57	1000	83.91	76.25	4.69	10807	16.01	11.77	12.97	12.21	10.62
886 Dsl. 16 Speed (1)	1339	Die.	13450	1710	6	3.875x5.063	358	2400	90.56	1000	88.23	80.13	4.69	10930	15.84	11.98	12.81	12.38	10.86
(1) Serial No. 2490208 U17026 and up.																			
966 Diesel	1123	Die.	13670	1970	6	4.300x4.750	414	2600	100.80	1000	101.52	88.94	6.58	10036	15.68	10.94	12.36	11.68	9.84
986 Diesel	1255	Die.	14000	970	6	4.300x5.000	436	2400	105.68	1000	104.16	94.60	4.98	12176	15.56	11.34	12.65	11.72	10.02
1066 Turbo Diesel	1124	Die.	15260	1945	6	4.300x4.750	414	2600	125.68	1000	119.20	108.87	7.03	13000	16.37	11.32	12.78	11.97	9.99
1086 w/Radial Tires	1247	Die.	15640	2915	6	4.300x4.375	414	2400	131.41	1000	133.67	116.28	4.40	13503	16.39	11.90	13.28	12.36	10.45
1086 w/Bial Ply Tires	1247	Die.	15640	3100	6	4.300x4.375	414	2400	131.41	1000	133.67	114.14	6.66	12137	16.39	11.90	12.83	12.08	10.52
1466 Turbo Diesel	1125	Die.	16660	2990	6	4.300x5.000	436	2600	145.77	1000	145.84	127.02	6.93	13673	17.03	11.83	13.03	12.01	10.35
1566 Turbo Dsl	1174	Die.	18260	3065	6	4.300x5.000	436	2600	161.01	1000	162.31	140.35	5.64	15774	16.16	11.51	12.55	11.69	9.86
1568 Diesel	1175	Die.	17350	2400	8	4.500x4.313	550	2600	150.70	1000	147.79	133.79	5.69	14918	14.99	12.08	13.00	12.59	10.80
1586 w/Radial Tires	1248	Die.	17600	2480	6	4.300x5.000	436	2500	161.55	1000	156.09	140.65	5.55	16665	16.51	12.23	13.02	12.38	10.51
1586 w/Bias Ply Tires	1248	Die.	17600	3010	6	4.300x5.000	436	2500	161.55	1000	156.09	140.08	6.05	15124	16.51	12.28	12.74	12.38	10.54
3288 Diesel	1438	Die.	13560	1800	6	3.875x5.062	358	2400	90.46	1000	88.33	80.72	6.11	11486	15.94	11.69	13.16	12.31	10.27
3388 Diesel	1319	Die.	17850	430	6	4.300x5.000	436	2400	130.61	1000	128.59	114.42	6.67	16764	16.85	12.00	13.52	12.17	10.09
3488 Hydro	1439	Die.	13940	1060	6	4.30x5.35	466	2400	112.56	1000	107.11	83.43	6.50	12152	15.28	10.64	10.00	9.73	8.43
3588 Diesel	1320	Die.	18890	1270	6	4.300x5.350	466	2400	150.41	1000	152.07	130.94	6.65	17589	16.98	12.19	13.13	12.20	10.30
3688 Diesel	1440	Die.	14335	1135	6	4.30x5.00	436	2400	113.72	1000	112.48	100.28	7.36	12250	15.75	11.82	13.30	12.35	10.38
3788 12 Speed	1377	Die.	20820	2200	6	4.300x5.350	466	2500	170.57	1000	166.39	146.43	7.49	19069	17.12	12.22	13.24	12.25	10.06
4366 Turbo D	1153	Die.	23000	1310	6	4.300x5.350	466	2600	....	....	....	168.90	6.65	23138	....	....	12.54	11.98	10.34
4386 Diesel	1256	Die.	24930	None	6	4.300x5.350	466	2600	....	....	....	176.02	8.71	23321	....	....	12.43	11.92	10.18
4568	1216	Die.	29870	4120	8	5.3125x4.50	798	2600	....	....	....	235.72	6.76	27995	....	....	12.89	11.79	9.73
4786 Diesel	1317	Die.	34350	4150	8	5.313x4.500	798	2600	....	....	....	265.55	4.79	33468	....	....	12.80	11.92	9.86
5088 Diesel (2)	1419	Die.	16250	240	6	4.30x5.00	436	2400	136.12	1005	136.12	121.17	5.06	14960	15.32	11.65	13.23	12.04	9.90
5288 Diesel	1420	Die.	18585	1530	6	4.30x5.35	466	2400	162.60	1005	162.60	142.37	5.27	17577	16.07	12.62	13.70	12.77	10.75
5488 Diesel	1441	Die.	20005	2765	6	4.30x5.35	466	2400	187.22	1005	187.22	164.82	5.27	18646	16.20	13.00	14.16	13.15	11.21
(2) Drawbar information is from test run with radial ply tires.																			
Kubota																			
L185	1285	Die.	3370	1430	2	3.000x3.23	45.3	2800	15.33	540	14.07	13.03	5.57	1939	13.60	10.90	10.38	10.82	9.26
L185DT	1286	Die.	3415	1283	2	3.000x3.23	45.3	2800	15.45	540	14.16	12.65	3.94	2322	13.49	11.00	10.34	10.24	8.70
L225 Diesel	1145	Die.	3452	1457	3	3.000x3.23	68	2700	20.86	1000†	19.96	17.69	6.34	2015	14.25	11.12	10.71	10.78	9.36
L235	1406	Die.	3715	1280	3	3.0x3.23	68	2600	19.59	540	19.63	16.05	4.68	2440	14.33	11.34	11.33	10.85	9.23
L245	1283	Die.	3694	1498	3	3.000x3.23	68	2800	22.06	540	20.11	18.66	5.74	2067	13.98	11.07	10.74	10.70	9.16
L245DT	1284	Die.	3792	1410	3	3.000x3.23	68	2800	22.35	540	20.15	18.48	6.06	2419	14.33	11.21	10.88	10.67	9.22
L275	1407	Die.	4055	1430	3	3.23x3.23	79.3	2600	23.42	540	23.01	19.70	4.84	2717	14.57	11.55	11.62	11.07	9.95
L285 Diesel	1198	Die.	4030	1585	4	2.992x3.228	91	2400	26.45	540	23.58	22.94	6.62	3134	14.63	12.16	11.78	12.16	10.65
L295DT and L295 8 Speed	1370	Die.	4700	1805	3	3.23x3.23	79.3	2800	26.46	540	24.91	22.82	4.34	3155	14.59	11.75	11.57	11.39	9.58
L305DT and L305 8 Speed	1371	Die.	5360	2070	3	3.23x3.23	79.3	2800	26.21	540	25.14	22.96	4.16	3918	13.83	11.14	11.15	11.13	9.46

L345DT and L345 8 Speed	1372	Die.	5435	2000	4	3.90x3.23	90.7	2800	29.35	540	28.80	26.72	4.62	3795	12.76	10.58	10.68	10.81	9.15
M4050DT and M4050 8 Speed	1495	Die.	7215	2275	6	3.23x3.23	158.5	2600	45.74	540	42.10	38.02	6.17	(1)	15.06	11.57	12.00	11.52	9.88
M4500DT & M4500 16 Speed	1348	Die.	7800	2635	6	3.23x3.23	158.5	2600	49.72	540	44.49	42.50	6.16	4812	15.19	12.22	11.90	12.02	10.77
M4950DT & M4950 12 Speed	1496	Die.	8195	2395	6	3.35x3.23	170	2600	49.57	540	45.47	41.43	4.68	(2)	14.70	11.21	11.68	11.15	9.26
M5500DT and M5500 16 Speed	1369	Die.	8710	3210	3	4.134x4.528	182	2400	53.99	540	49.18	46.96	5.51	6287	16.42	12.44	13.05	12.77	11.05
M5950DT & M5950 12 Speed	1497	Die.	9220	3100	3	4.29x4.53	196	2400	58.00	540	52.81	49.29	5.09	(3)	17.08	13.44	13.64	13.53	11.83
M6950DT & M6950 12 Speed	1498	Die.	9575	2530	4	4.13x4.53	243	2400	66.44	540	63.96	56.74	5.02	(4)	16.98	13.26	13.72	13.28	11.33
M7500DT & M7500 16 Speed	1349	Die.	9510	3530	4	4.134x4.528	243	2400	72.34	540	66.54	61.29	6.65	6327	17.83	14.15	13.93	14.20	12.40
M7950DT & M7950 12 Speed	1499	Die.	10305	3205	4	4.29x4.53	262	2400	75.44	540	6932	65.24	5.26	(5)	17.14	13.57	13.88	13.82	11.93

(1) M4050, 4259; M4050DT, 6070. (2) M4950, 5292; M4950DT, 6750. (3) M5950, 5749; M5950DT, 8350. (4) M6950, 6517; M6950DT, 8465. (5) M7950, 7244; M7950DT, 9641.

Lamborghini																			
1056DT	1269	Die.	12050	1700	6	3.86x4.72	331	2220	92.13	1000	89.98	79.51	6.86	9135	15.16	13.02	12.45	12.74	10.93
Leyland																			
245 Diesel	1177	Die.	7850	1970	3	3.600x5.000	152.7	2250	39.73	540	36.38	35.09	4.47	5056	16.30	12.60	13.02	12.67	11.29
255 Diesel	1176	Die.	8610	2310	4	3.858x4.921	230	2200	47.91	540	43.85	43.00	6.58	5891	16.42	11.10	12.78	11.81	9.50
472 & 272 Die 9 Speed	1341	Die.	11990	4580	4	3.858x4.921	230	2200	63.52	540	58.50	53.27	5.91	7224	14.97	12.28	11.32	11.67	10.48
482 & 282 Die 9 Speed	1340	Die.	12000	4590	4	3.858x4.921	230	2200	74.28	540	70.86	61.19	5.86	7032	17.58	12.63	12.70	12.10	10.09
2100 Diesel	1178	Die.	13260	4350	6	3.860x4.920	344.7	2100	88.40	1000	83.30	75.70	4.95	8617	16.29	13.20	13.16	13.24	11.24
Long																			
360 Diesel	1298	Die.	6410	1930	3	3.74x4.33	143	2400	36.16	540	31.06	31.91	5.20	4808	14.41	11.97	12.45	12.13	10.48
510 Diesel	1415	Die.	8210	3925	3	4.02x4.33	164.5	2400	49.15	540	46.91	43.27	5.14	6040	15.74	13.48	13.15	13.52	12.24
510DTC Diesel	1416	Die.	9100	3835	3	4.02x4.33	164.5	2400	49.35	540	46.41	41.37	4.63	5635	16.47	13.72	13.68	13.30	11.69
610 Diesel	1417	Die.	8985	4290	4	4.02x4.33	219	2400	64.33	540	60.57	57.48	5.37	7018	15.93	13.46	13.58	13.51	11.92
900 Diesel and 910 Diesel	1163	Die.	12575	4375	4	4.33x4.72	278	2200	72.88	1000	72.86	62.50	6.53	7843	13.06	12.15	10.97	13.00	11.38
Massey-Ferguson																			
MF154-4	1411	Die.	6920	1615	3	3.6x5.0	153	2250	42.52	540	40.38	35.40	4.52	4144	17.26	13.41	13.79	13.00	11.42
MF184-4 12 Speed	1392	Die.	7775	1395	4	3.875x5.0	236	2200	62.45	540	59.56	52.38	7.13	5500	16.41	12.37	12.61	12.11	10.69
MF205 6 Speed	1363	Die.	2840	935	2	3.46x3.46	65.2	2400	16.56	540	16.34	13.45	4.39	1995	12.97	9.62	9.98	9.65	8.03
MF205-4 6 speed	1364	Die.	3120	905	2	3.46x3.46	65.2	2400	16.40	540	16.18	13.57	4.86	2131	12.83	9.69	10.04	9.57	8.02
MF210 12 Speed	1365	Die.	3550	1090	2	3.62x3.74	77.1	2500	21.96	540	21.23	18.08	5.81	2159	13.61	11.04	10.84	10.53	9.36
MF210-4 12 Speed	1366	Die.	3765	1030	2	3.62x3.74	77.1	2500	21.77	540	21.02	17.60	6.91	2158	13.18	10.75	9.97	10.44	8.61
MF220 12 Speed	1367	Die.	4220	1455	2	3.82x3.94	90.3	2500	26.37	540	25.52	23.95	4.34	3287	13.36	11.07	11.22	11.60	10.17
MF220-4 12 Speed	1368	Die.	4487	1307	2	3.82x3.94	90.3	2500	26.48	540	26.06	22.91	3.84	3496	14.09	11.56	11.09	11.55	10.02
MF230 Gasoline	1215	Gas.	[illegible]370	1030	4	3.375x4.062	145	2000	34.34	540	31.29	29.58	5.08	3717	11.85	8.72	9.89	8.90	7.85
MF230 Diesel	1214	Die.	5110	1110	3	3.600x5.000	153	2000	34.53	540	30.80	29.66	7.64	4030	18.18	14.81	15.06	14.74	12.87
MF235 Gasoline	1194	Gas.	5785	1655	4	3.375x4.062	145	2250	41.13	540	33.87	35.29	5.86	4294	10.49	7.99	8.69	8.07	6.69
MF235 Diesel	1187	Die.	5860	1725	3	3.600x5.000	153	2250	42.39	540	35.29	36.29	5.84	4281	16.78	13.52	13.80	13.39	11.56
MF245 Diesel	1251	Die.	6150	2100	3	3.600x5.000	153	2250	42.90	540	36.50	36.75	5.92	4279	16.25	12.72	12.43	12.79	11.13
MF245 Gasoline	1252	Gas.	6020	2120	4	3.375x4.062	145	2250	41.09	540	34.15	35.50	5.90	4298	11.74	9.07	9.50	9.07	7.88
MF254 12 Speed	1478	Die.	7275	1790	3	3.60x5.00	153	2250	43.36	540	40.71	35.14	5.82	3844(1)	16.58	13.43	12.84	12.51	10.62
MF255 Gasoline	1190	Gas.	7280	1140	4	3.875x4.500	212	2000	50.01	540	47.14	43.49	5.28	5668	10.91	8.00	8.94	8.54	6.72
MF255 Diesel	1189	Die.	7130	1160	4	3.600x5.000	203	2000	50.69	540	45.55	43.72	5.28	5257	15.88	13.32	13.44	13.36	12.24
MF255 12-Speed	1250	Die.	7310	895	4	3.875x5.000	236	2000	52.68	540	48.37	44.75	7.89	5591	16.92	12.70	13.34	12.82	11.03
MF265 Diesel	1188	Die.	8200	1815	4	3.875x5.000	236	2000	60.73	540	54.76	51.87	5.23	6248	15.88	13.44	13.52	13.51	12.16
MF274 12 Speed	1479	Die.	8190	2205	4	3.875x5.00	236	2200	55.39	540	54.26	47.42	6.74	4719(2)	17.25	12.80	13.76	12.66	10.59
MF275 Diesel	1193	Die.	9330	2720	4	3.975x5.000	248	2000	67.43	540	61.76	60.16	5.16	7292	14.18	12.51	13.04	13.22	11.63
MF285 Diesel	1171	Die.	11760	4110	4	4.500x5.000	318	2000	81.96	1000	81.96	70.53	7.77	8846	14.98	12.68	12.85	12.90	11.34
MF294 12 Speed	1480	Die.	8645	1925	4	3.975x5.00	248	2100	67.39	540	64.94	56.80	6.02	5665(3)	17.58	14.53	14.68	13.95	12.54
MF1085 Diesel	1133	Die.	14385	2845	4	4.500x5.000	318	2000	81.58	1000	81.58	70.76	5.58	10355	15.82	13.21	13.43	13.15	11.55
MF1105 Diesel	1132	Die.	16725	4405	6	3.875x5.000	354	2200	100.72	1000	96.43	86.26	4.36	11365	15.43	11.53	12.37	11.55	9.81

Nebraska Tractor Tests Summarized (Tests from 1973 through 1983)

						ENGINE									-FUEL CONSUMPTION (HP Hours Per Gallon) @:-				
																	-Varying Drawbar Power-		
MAKE AND MODEL OF TRACTOR	Test No.	Fuel Used	Weight With Ballast	Lbs. Ballast Carried	No. of Cylinders	Bore and Stroke	Displacement Cu. In.	Rated RPM Dwbr.	Max. PTO HP @ Rated Engine RPM	Std. PTO RPM	Max. PTO HP @ Std. PTO RPM	Max. Drawbar HP	MPH @ Max. Dwbr. HP	Max. Lbs. Pull	Max. PTO HP @ Std. PTO RPM	PTO Average @ Varying Power	Max. Available Power	75% of Pull Max. Power	50% of Pull @ Max. Power
Massey-Ferguson Cont.																			
MF1135 Diesel	1135	Die.	18900	5350	6	3.875x5.000	354	2200	120.84	1000	118.47	106.52	4.56	13955	16.18	12.24	13.22	12.56	10.71
MF1155 Diesel	1134	Die.	20460	5554	8	4.250x4.75	540	2200	140.97	1000	134.11	124.90	4.40	15630	15.66	12.77	13.15	13.00	11.45
MF1505 Diesel	1172	Die.	20970	3010	8	4.500x5.000	636	2800	174.46	1000	175.95	154.10	6.98	17226	14.55	11.41	12.27	11.43	9.54
MF1805 Diesel	1173	Die.	22790	4790	8	4.500x5.000	636	2800	192.65	1000	191.60	170.17	6.95	18781	14.77	12.14	12.76	12.41	10.77
MF2640 16 Speed	1481	Die.	16380	3945	6	3.875x5.00	354	2400	90.95	1000	87.60	75.56	4.31	10623(4)	15.81	11.67	12.15	11.46	9.70
MF2675, 8-Speed	1321	Die.	14280	1930	6	3.875x5.0	354	2500	100.84	1000	95.00	86.18	5.91	10226	15.00	11.14	11.48	11.57	10.01
MF2675, 24-Speed	1309	Die.	14495	2065	6	3.875x5.0	354	2500	103.29	1000	96.67	87.47	5.09	9674	15.43	11.56	11.76	11.49	9.95
MF2705, 8-Speed	1322	Die.	16800	4295	6	3.875x5.0	354	2500	121.11	1000	114.44	101.47	6.17	12588	16.84	11.22	12.54	11.30	9.45
MF2705, 24-Speed	1310	Die.	17490	4895	6	3.875x5.0	354	2500	122.20	1000	115.85	104.23	5.30	13085	16.65	11.22	12.74	11.27	9.23
MF2745 Diesel	1311	Die.	19490	4300	8	4.25x4.75	539	2600	143.40	1000	132.21	125.17	5.51	15386	15.40	10.62	11.96	11.13	9.39
MF2775	1278	Die.	20440	4210	8	4.63x4.75	640	2600	165.95	1000	149.86	143.70	5.72	17407	16.05	11.50	12.57	11.52	9.85
MF2775 8 Speed	1389	Die.	20170	4365	8	4.63x4.75	640	2600	162.09	1000	146.87	139.68	5.73	16766	15.78	11.19	12.45	11.68	9.56
MF2805 24-Speed	1258	Die.	21170	5540	8	4.630x4.750	640	2500	194.62	1000	181.77	160.72	7.10	17369	16.29	11.33	12.21	11.14	9.27
MF2805 8 Speed	1399	Die.	21430	5395	8	4.63x4.75	640	2500	190.81	1000	186.29	164.58	5.41	17647	16.59	10.97	12.41	11.43	9.58
MF4800 Die 12 & 18 Speed	1342	Die.	30520	None	8	5.5x4.75	903	2600	179.31	1000	172.88	159.08	4.82	25294	15.10	10.12	12.13	10.73	8.39
MF4840 Die 12 & 18 Speed	1343	Die.	30920	None	8	5.5x4.75	903	2600	210.67	1000	210.61	186.36	4.84	28191	15.57	10.77	12.41	11.25	9.32
MF4880 Die 12 & 18 Speed	1344	Die.	32450	1360	8	5.5x4.75	903	2600	272.81	1000	267.38	244.57	6.54	29272	16.80	11.51	13.50	11.98	9.58
MF4900 18 Speed	1391	Die.	33940	2975	8	5.5x4.75	903	2600	320.55	1000	323.88	278.78	6.53	30090	16.80	11.95	13.26	11.82	9.87
(1) 5279 with front drive engaged. (2) 6194 with front drive engaged. (3) 7253 with front drive engaged. (4) 13707 with front drive engaged.																			
Minneapolis-Moline																			
G955	1161	Die.	12060	None	6	4.375x5.000	454	1800	98.36	1000	98.82	83.40	5.44	8374	13.92	11.93	11.26	11.76	10.29
G1355 Diesel	1141	Die.	18070	974	6	4.750x5.500	585	2200	142.62	1007	142.62	128.95	7.89	14178	15.21	12.47	13.61	12.85	11.23
Oliver																			
2255 Diesel	1140	Die.	17990	1583	8	4.500x4.500	573	2600	146.72	1000	147.65	126.13	5.70	14770	15.66	12.47	13.43	12.95	11.25
Same																			
Panter 4WD Diesel	1185	Die.	12000	2772	5	3.860x4.720	276	2200	80.02	1000	79.10	66.67	5.75	10389	14.79	12.74	12.40	12.30	10.00
Tiger 100 Diesel	1268	Die.	11620	2500	5	4.13x4.72	317	2200	90.45	1000	89.42	78.84	6.35	9116	15.48	13.22	12.41	13.08	11.26
Buffalo 4WD Diesel	1186	Die.	13795	3708	6	4.130x4.720	380	2200	104.94	1000	104.94	88.24	4.24	10941	15.23	12.78	12.47	12.44	10.76
Satoh																			
S750DD & S750D 9 Speed	1347	Die.	5550	1620	3	3.386x4.016	108.4	2500	33.45	540	28.11	28.90	5.93	4295	11.92	10.89	9.86	11.18	9.58
Steiger																			
Wildcat III ST-210 & RC-210	1237	Die.	22260	None	8	4.500x5.000	636	2800	....	....	....	171.44	5.84	21052	....	....	12.71	12.58	10.82
Bearcat II	1162	Die.	23020	1585	8	4.500x5.000	636	2800	....	....	....	180.69	6.57	22622	....	....	12.79	12.37	10.82
Bearcat III ST-220	1246	Die.	29380	None	6	5.500x6.000	855	2100	....	....	....	175.58	4.84	26936	....	....	13.24	12.60	11.04
Bearcat III ST-225(1)	1414	Die.	30005	465	6	4.75x6.0	638	2100	....	....	....	197.69	5.47	28805	....	....	13.99	13.54	11.65
Bearcat III PT225	1272	Die.	30825	None	6	4.75x6.00	638	2200	(3)	....	....	180.86	6.33	29749	....	....	12.02	10.80	9.29
Cougar II	1170	Die.	27995	1305	6	4.750x6.000	638	2200	....	....	....	228.15	4.44	26432	....	....	13.15	12.77	11.59
Cougar III ST-250	1239	Die.	29800	None	6	4.750x6.000	638	2200	....	....	....	210.35	6.38	26612	....	....	12.74	11.90	10.36
Cougar III ST-250(2)	1452	Die.	29965	None	6	4.75x6.0	638	2100	....	....	....	215.98	5.39	26866	....	....	15.16	14.40	12.76
Cougar III ST-251	1233	Die.	30840	None	6	5.500x6.000	855	2100	....	....	....	205.82	7.98	26880	....	....	14.74	13.69	11.60
Cougar III PT270	1273	Die.	32210	1495	6	4.75x6.00	638	2200	(3)	....	....	219.39	6.29	30122	....	....	12.73	11.81	10.23
Cougar III ST-270	1238	Die.	29930	None	6	4.750x6.000	638	2200	....	....	....	228.96	6.38	25371	....	....	13.32	12.62	10.96
Cougar III PTA 280	1402	Die.	33675	2895	6	5.5x6.0	855	2100	....	....	....	224.92	5.54	32625	....	....	13.74	12.54	10.44
Cougar III PTA-280	1413	Die.	33150	2370	6	5.4x6.5	893	2100	....	....	....	236.55	7.07	32085	....	....	14.24	13.14	11.19
Cougar III ST-280	1401	Die.	33105	2625	6	5.5x6.0	855	2100	....	....	....	236.82	5.37	31517	....	....	14.55	13.20	11.05
Cougar III ST-280	1412	Die.	33345	2705	6	5.4x6.5	893	2100	....	....	....	246.13	6.28	32099	....	....	14.86	13.76	11.69

Panther III ST-310	1235	Die.	30850	None	6	5.500x6.000	855	2100	....	....	....	261.78	7.90	26757	....	....	13.95	13.09	11.02
Panther III ST-325	1236	Die.	31080	None	6	5.400x6.500	893	2100	....	....	....	281.94	7.93	28189	....	....	14.82	14.19	12.64
Panther III PTA-325	1355	Die.	33960	3140	6	5.4x6.5	893	2100	....	....	....	274.88	5.34	31876	....	....	14.26	13.45	11.55
Panther III PT350	1274	Die.	34000	2855	8	5.4x4.75	903	2600	(3)	....	....	305.48	6.51	32276	....	....	14.91	13.75	11.32
Panther CP-1325 12 Sp.	1453	Die.	35870	410	6	5.40x6.50	893	2100	299.10	1000	299.10	275.74	6.24	33802	16.55	13.59	14.71	13.86	11.95
Panther CP-1360 12 Sp.	1455	Die.	39120	3860	6	5.40x6.50	893	2100	334.33	1000	334.33	300.05	6.21	36123	16.75	13.78	15.11	13.81	11.85
Panther CP-1400 12 Sp.	1464	Die.	43615	7165	6	5.40x6.50	893	2100	....	....	....	343.73	7.36	40580	....	....	16.11	14.12	12.07
Panther KP-1325 12 Sp.	1465	Die.	35815	605	6	5.50x6.00	855	2100	301.21	1000	301.21	283.90	6.24	34267	17.38	13.97	16.48	14.15	11.84
Panther KP-1360 12 Sp.	1456	Die.	39570	4090	6	5.50x6.00	855	2100	326.12	1000	326.12	316.04	5.53	36771	17.39	14.15	16.37	14.27	12.15
Panther KP-1400 12 Sp.	1463	Die.	43175	6640	6	5.50x6.00	855	2100	....	....	....	348.78	6.11	41834	....	....	17.06	14.54	12.10
Tiger II	1169	Die.	29930	2330	8	5.500x4.750	903	2600	....	....	....	270.21	6.73	28097	....	....	13.88	12.70	10.61
Tiger III ST450	1282	Die.	47370	4645	6	6.25x6.25	1150	2100	....	....	....	372.61	6.56	42610	....	....	14.18	12.70	10.56

(1) SN. 109-00328 and higher. (2) SN. 104-00331 and higher. (3) Equipped with hydrostatic PTO-105HP at 1000 RPM.

Versatile

555 Diesel	1331	Die.	25980	6330	8	4.625x4.125	555	2850	182.25	1000	184.35	154.20	4.56	23533	16.33	11.15	12.96	11.17	8.83
835 12 Speed	1356	Die.	28000	3720	6	5.5x6.0	855	2100	198.23	1009	198.23	179.07	6.13	26360	15.13	11.36	13.16	11.87	9.70
835 Series 3 12 Speed SN.835-83-036769 & higher	1482	Die.	27980	3595	6	5.50x6.00	855	2100	200.30	1000	200.30	190.67	5.11	25687	15.82	11.86	16.11	12.74	10.45
875 Diesel	1279	Die.	29500	4980	6	5.5x6.0	855	2100	248.07	1008	248.07	228.35	9.12	24457	15.45	11.76	13.60	12.28	10.40
875 Diesel	1332	Die.	29480	4160	6	5.5x6.0	855	2100	247.16	1008	247.16	221.66	4.86	26795	16.06	12.02	14.35	12.53	10.34
875 Series 3 12 Speed SN. 875-83-057906 & higher	1483	Die.	29500	3870	6	5.50x6.00	855	2100	252.67	1000	252.67	234.67	5.88	26725	16.82	13.06	16.62	13.73	11.82
895 Diesel, 12 Speed	1335	Die.	32500	7880	6	5.5x6.0	855	2100	....	....	....	261.63	6.45	29402	....	....	15.15	13.72	11.57
1150 8 Speed	1462	Die	46500	11360	6	6.25x6.25	1150	2100	....	....	....	420.03	7.02	43052	....	....	17.00	14.64	12.35

White

2-30 8 Speed	1373	Die.	3853	848	3	3.386x3.386	91.4	2600	28.33	540	24.50	25.81	8.35	2816	12.03	10.27	10.77	11.42	9.61
2-35 8 Speed	1374	Die.	3970	800	3	3.386x4.02	108.4	2400	32.84	540	30.94	30.37	8.00	2978	12.68	10.86	11.23	11.73	10.35
2-45 20 Speed	1395	Die.	6630	660	4	3.858x3.62	169.3	2250	43.73	540	36.62	37.32	3.97	4455	12.70	11.25	10.96	11.00	9.66
2-50 Field Boss	1231	Die.	6880	2325	3	3.940x4.330	158	2500	47.02	540	43.94	41.88	4.80	5640	15.80	13.03	13.26	13.49	11.97
2-55 16 Speed	1466	Die.	7055	860	4	4.02x3.94	199.4	2200	53.32	540	45.74	48.74	4.98	5037(1)	14.89	12.38	13.35	13.21	11.39
2-60 Field Boss	1232	Die.	8990	3830	4	3.940x4.330	211	2400	63.22	540	54.35	54.78	5.07	7352	17.63	13.82	14.40	13.87	11.93
2-62 20 Speed	1396	Die.	6875	635	4	4.016x4.33	219	2200	61.46	540	54.25	51.63	6.05	4695	16.31	13.85	13.76	13.49	12.08
2-65 16 Speed	1467	Die.	7110	790	4	4.02x4.65	235	2200	62.50	540	55.40	56.85	6.66	4827(2)	16.19	12.91	13.94	13.20	11.29
2-70 Diesel	1212	Die.	9630	1000	6	3.875x4.000	283	2200	70.71	994	70.71	59.47	6.40	7550	14.56	12.28	11.92	12.13	10.72
2-75 16 Speed	1486	Die.	9625	1705	6	4.016x4.33	329	2200	75.39	1000	75.64	65.05	6.04	6487(3)	15.86	12.02	13.07	12.21	10.48
2-85 Diesel	1213	Die.	12280	580	6	3.875x5.000	354	2200	85.54	1007	85.54	71.93	8.13	9309	14.62	11.72	12.24	11.64	9.71
2-88 18 Speed	1487	Die.	13615	None	6	3.875x5.00	354	2200	86.78	1000	86.78	74.67	6.51	9486(4)	15.71	12.69	13.62	12.74	10.79
2-105 Field Boss	1181	Die.	11810	None	6	3.875x5.000	354	2200	105.61	1007	105.61	90.81	6.34	9212	15.76	12.02	12.89	11.95	10.00
2-110 18 Speed	1468	Die.	13955	None	6	3.875x5.00	354	2200	110.52	1000	110.52	96.08	6.56	9500(5)	16.77	13.27	14.44	13.08	10.84
2-135	1275	Die.	16360	2225	6	4.56x4.87	478	2200	137.64	1000	138.03	117.67	8.93	11907	14.91	11.38	12.31	11.42	9.73
2-150 Field Boss	1182	Die.	16940	None	6	4.750x5.500	585	2200	147.49	1007	147.49	127.49	5.63	15059	14.46	11.90	12.07	12.14	10.63
4-150 Field Boss	1159	Die.	16960	None	8	4.500x5.000	636	2800	151.87	1000	152.45	133.34	6.34	16925	15.09	11.45	12.46	11.34	9.21
2-155	1276	Die.	16650	None	6	4.56x4.87	478	2200	157.73	1000	162.37	139.68	9.04	14512	15.38	11.91	12.69	11.53	9.97
4-175 Field Boss	1375	Die.	20420	None	8	4.5x5.0	636	2600	151.69	1000	151.29	133.72	6.39	19905	15.50	11.70	12.96	11.98	10.01
2-180	1287	Die.	18280	None	8	4.5x5.0	636	2800	181.89	1000	181.89	163.64	6.50	15499	14.38	11.66	12.85	12.48	10.56
4-180 Field Boss	1184	Die.	20600	None	8	4.500x5.000	636	2800	181.07	1000	182.30	156.54	4.59	20469	14.19	11.47	11.79	11.56	9.98
4-210 Field Boss	1318	Die.	23735	None	8	4.5x5.0	636	2800	182.44	1000	182.44	162.25	5.89	22934	14.26	11.53	12.34	12.10	10.25

(1) 6318 with front wheel drive engaged. (2) 6187 with front drive engaged. (3) 8028 with front drive engaged. (4) 12632 with front drive engaged. (5) 12944 with front drive engaged.

Yanmar

YM240 Diesel	1199	Die.	3305	1355	2	3.543x3.543	70	2400	19.76	540	18.75	16.60	4.86	2442	15.05	12.64	12.35	11.95	10.37
YM226D Diesel	1442	Die.	3380	1080	3	2.95x3.35	68.7	2600	19.42	540	17.87	16.14	4.78	2073	15.07	11.67	11.92	10.93	9.26
YM276D Diesel	1443	Die.	4110	1405	3	3.31x3.35	86.2	2600	23.00	540	22.82	18.93	5.78	2412	14.35	11.06	11.08	10.57	8.90
YM336D Diesel	1444	Die.	5020	1615	3	3.31x3.54	91.3	2600	26.96	540	25.63	23.00	6.28	3086	14.27	11.32	11.39	10.66	9.64

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April 1984
TWO DOLLARS

Implement & Tractor

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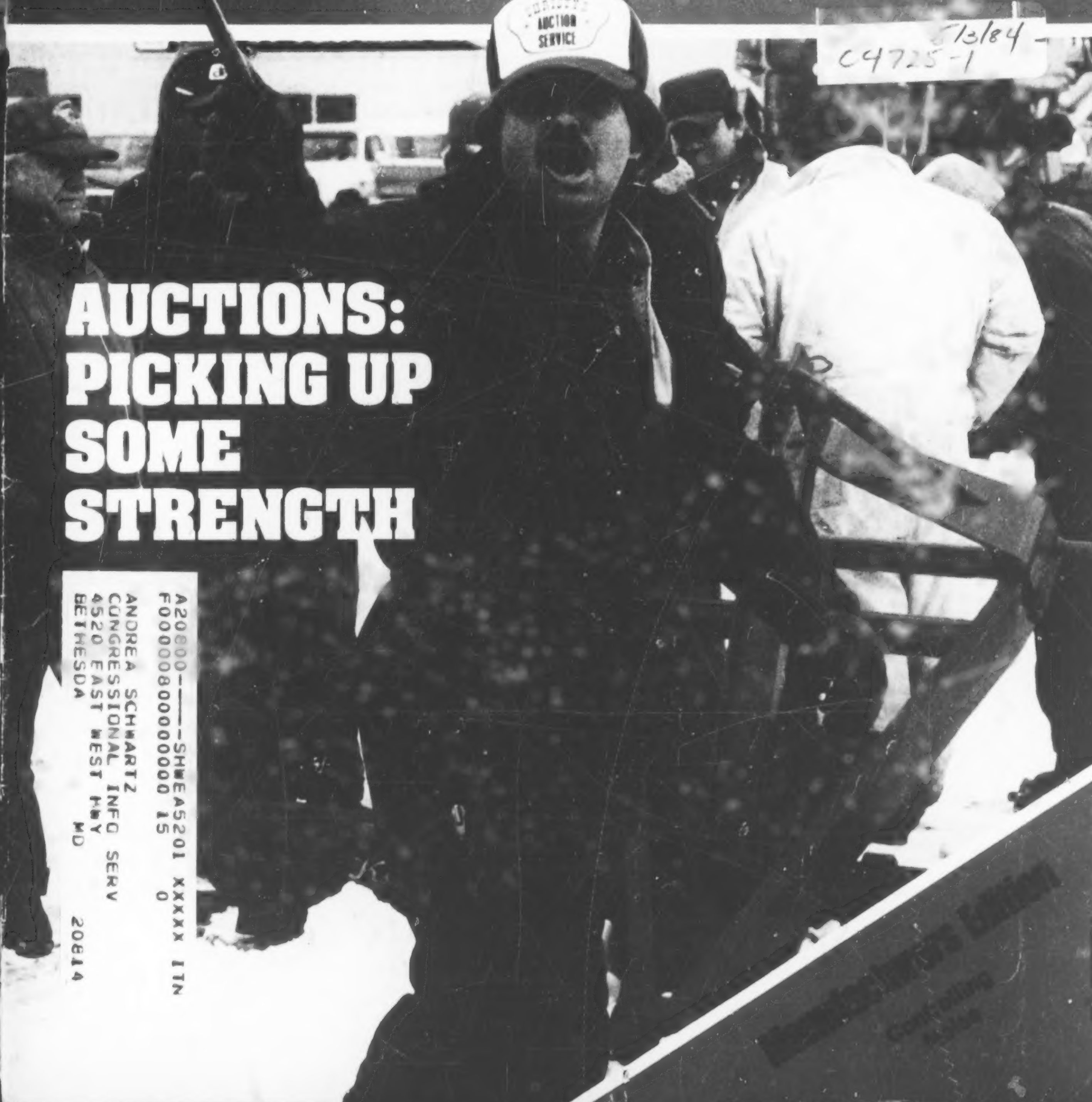

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IMPLEMENT & TRACTOR
Editorial, advertising
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should be addressed to:
9221 Quivira Rd.
P.O. Box 12901
Overland Park, Kan. 66212
(a suburb of Kansas City, Mo.)
Telephone (913) 888-4664
Telex: 42-4156; Answerback
Intertec OLPK

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I&T Update

February Sales: Why the Big Jump in Tractor Unit Volume?

Tractor retail sales, according to the Farm & Industrial Equipment Institute flash report, took a February jump in all but one horsepower category, building on a modest but generally favorable January start. Industry watchers debated: Are we seeing the start of the sales rebound that has been awaited for several years or are we looking at some late reporting of December sales motivated by tax considerations? (In the first quarter of 1983, combines showed astonishing strength in the face of PIK sign-ups, and it could have been connected to massive factory discounting of combines in late 1982, if reporting was a little late.)

The switch in two-wheel-drive tractors from the 100-139 hp bracket to larger items continued, and four-wheel-drive units showed a turnaround. But most of the numbers among other flash report items were down.

Unit Retail Sales

	February			January-February		
	1984	1983	Pct. Change	1984	1983	Pct. Change
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	2,665	2,306	+15.6	4,805	4,374	+ 9.9
40-99 hp	2,697	2,474	+ 9.0	5,779	5,064	+14.1
100-139 hp	601	1,003	−40.1	1,337	2,422	−44.8
Over 140 hp	1,001	533	+87.8	2,223	1,459	+52.4
Total 2-wheel drive	**6,964**	**6,316**	**+10.3**	**14,144**	**13,319**	**+ 6.2**
4-wheel drive						
Under 200 hp	128	75	+70.7	269	261	+ 3.1
Over 200 hp	225	118	+90.7	412	323	+27.6
Total 4-wheel drive	**353**	**193**	**+82.9**	**681**	**584**	**+16.6**
Total All Tractors	**7,317**	**6,509**	**+12.4**	**14,825**	**13,903**	**+ 6.6**
S-P Combines	620	708	−12.4	1,708	2,504	−31.8
Balers (200-lb. bales)	318	325	− 2.2	596	716	−16.8
Forage Harvesters (shear-bar type)	109	146	−25.3	227	317	−28.4
Mower Conditioners	541	407	+32.9	991	970	+ 2.2

Briefly...

Allis-Chalmers is selling its light industrial tractor line to CDI Sales Corp., Minneapolis. The sale includes all patents, assets and inventories of rough-terrain forklifts, wheel loaders and tractor backhoes. The plant at Topeka, Kan., stays with A-C and will continue to make combine components and corn heads.

International Harvester Co. and France's Renault will be jointly buying and making farm equipment parts, according to a recent agreement. Marketing and distribution networks will be separate, but some supply and production facilities will be pooled.

Tractor Sales Up 20 Pct. in Canada

Canadian retail sales of farm tractors in January and February have topped performance of a year earlier, according to the Canadian Farm & Industrial Equipment Institute. Tractor volume in January was up to 9.7 per cent to 1,283 units. In February, the rise was 35 per cent to 1,016 units.

Specifically, for the two months: tractors under 40 hp, up 39 per cent at 340; 40-99 hp, up 36 per cent to 1,042; over 100 hp, down 13 per cent at 552; all two-wheel drive tractors, up 18 per cent at 1,934. Four-wheel-drive tractors, up 31 per cent at 365 units. Total tractors sold in the two months, 2,299, up 20 per cent.

Farm Equipment Exports Hurting

According to the U.S. Dept. of Commerce, U.S. exports of farm equipment in 1983 were $2.014 billion, which represented a 16 per cent drop from 1982. Among our biggest customers, here's what happened:

Canada, down 15 per cent to $852 million; Mexico, down 64 per cent to $45.6 million; Saudi Arabia, *up 105 per cent to $307.8 million;* Australia, down 55 per cent to $98 million; South Africa, down 13 per cent to $57 million; W. Germany, down 14 per cent to $76 million; France, down 18 per cent to $98 million; Britain, down 9 per cent to $66 million; Belgium, down 17 per cent to $55 million.

Keeping Up With Deere & Co.

(Compiled by I&T editors from news releases and articles in other media.)

First Quarter Profit. Deere & Co. reported net income of $2 million in the first quarter of fiscal 1984 (ended Jan. 31) compared with a $28.5 million loss last year. Income benefited from a LIFO inventory reduction of $5.4 million after taxes and a patent infringement settlement (with International Harvester) of $8.1 million after taxes.

Sales of $887 million were up three per cent from a year earlier, but farm equipment sales of $719 million were off three per cent. Industrial equipment volume rose 39 per cent to $167.5 million. Trade receivables, mostly dealer inventories, were $2.7 million on Jan. 31, about the same as a year earlier and at the end of the 1983 fiscal year.

Deere Buys Rotary. Curtiss-Wright Corp. has sold its rotating combustion engine business to Deere & Co. Deere pays $2 million initially, followed by cash payments to July 1, 1991. If Deere elects to meet all installment payments, total price will be $14.7 million plus interest. Deere said it has particular interest in the stratified charge version of the engine for its government sales group.

Deere Sells Snowmobile. Polaris Industries, Inc., Minneapolis, has bought Deere's snowmobile business. Deere said it intends using the freed-up production space at its Horicon, Wis., plant to do R&D and production of lawn care products.

Deere Buys IH Saltillo Facilities. Deere & Co. has acquired International Harvester Co.'s Mexican farm equipment works at Saltillo, which had been idle. Deere said the operation will produce mainly tractors.

Deere Pays Antiboycott Penalty. Deere & Co. has agreed to pay a $109,000 penalty to the U.S. Commerce Dept. for alleged violations of the antiboycott regulations of the Export Administration Act. Deere's parts distribution center in Germany allegedly furnished 109 items of information to Iraq, Oman, Saudi Arabia and the United Arab Emirates about its business relationships with Israel, certifying that goods supplied were not of Israeli origin. Deere, noted the Commerce Dept., voluntarily disclosed the actions.

RETAIL SALES OF SELECTED FARM EQUIPMENT – Jan.-Dec., 1982 and 1983(1)
(In Units)

	Combines Self-Propelled		Corn Heads		Hay Balers(2)		Windrowers Self-Propelled Power Units		Windrowers Self-Propelled Total Heads		Grinder-Mixers		Shear-Bar Forage Harvesters(3)		Mower Conditioners All Types	
	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983
Alabama	113	110	29	16	105	112	1	.....	1	.....	74	67	35	12	112	84
Alaska	.....	.....	.....	.....	12	4	.....	.....	.....	.....	1	.....	1	2	6	5
Arizona	31	9	5	1	26	17	34	34	47	39	8	1	9	4	9	6
Arkansas	308	365	7	3	102	131	.....	.....	.....	.....	48	49	7	10	239	234
California	183	91	49	33	141	110	172	150	191	172	7	2	54	56	35	35
Colorado	228	147	114	43	332	290	159	136	170	149	34	18	61	39	106	114
Connecticut	1	.....	.....	.....	39	45	.....	.....	.....	.....	1	2	34	27	73	62
Delaware	15	24	10	14	11	8	.....	1	.....	1	7	3	2	2	7	11
Florida	40	29	17	5	64	56	2	.....	2	.....	13	8	26	13	65	57
Georgia	383	197	122	82	146	128	1	8	2	8	129	66	53	25	157	134
Hawaii	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Idaho	291	231	9	6	367	288	209	160	215	184	26	18	26	40	109	102
Illinois	1,714	1,417	1,790	1,342	199	217	7	11	8	12	312	281	140	116	464	455
Indiana	721	778	775	719	186	212	4	3	5	5	205	215	88	84	329	409
Iowa	1,895	1,411	1,904	1,323	231	193	82	39	102	46	749	703	278	187	689	585
Kansas	1,377	852	141	82	218	199	140	154	158	156	160	88	126	69	485	420
Kentucky	178	128	117	87	186	182	4	6	6	5	177	127	105	69	619	717
Louisiana	128	144	6	2	66	68	.....	.....	.....	1	12	11	13	2	50	21
Maine	4	3	5	.....	46	48	2	1	2	1	3	1	30	22	70	70
Maryland	75	71	85	61	73	88	9	5	10	5	34	21	53	26	97	129
Massachusetts	.....	.....	1	1	35	48	.....	.....	.....	.....	3	.....	33	32	56	57
Michigan	263	260	273	234	230	236	29	23	28	26	151	140	208	181	384	428
Minnesota	1,013	1,008	734	659	447	574	349	245	383	257	392	319	458	386	745	865
Mississippi	236	215	8	6	73	57	1	3	1	3	39	33	36	23	60	41
Missouri	732	435	255	128	246	278	16	14	20	15	304	188	77	91	901	799
Montana	397	350	3	.....	205	123	303	179	369	213	49	38	34	17	148	111
Nebraska	1,143	771	809	540	143	123	179	131	213	152	346	213	239	141	412	375
Nevada	2	1	.....	.....	29	23	46	33	50	38	1	3	5	6	9	7
New Hampshire	.....	.....	1	.....	25	45	.....	.....	.....	– 1	.....	.....	17	25	62	41
New Jersey	6	8	10	2	32	39	2	.....	2	.....	9	5	10	7	36	50
New Mexico	33	3	3	.....	121	101	39	46	39	50	5	5	16	9	26	24
New York	90	49	97	58	519	460	37	38	38	40	84	67	440	419	727	787
North Carolina	295	222	254	194	189	202	.....	1	.....	1	93	72	71	47	261	339
North Dakota	910	682	73	49	32	34	472	319	549	368	91	82	81	67	186	161
Ohio	382	481	405	356	301	359	9	9	9	10	220	167	154	130	547	618
Oklahoma	559	257	13	6	216	263	78	74	92	83	72	61	22	16	415	520
Oregon	130	130	16	2	209	215	127	93	145	114	10	17	21	21	115	135
Pennsylvania	108	94	131	97	548	595	35	25	37	28	242	156	351	272	775	817
Rhode Island	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	1	5	2
South Carolina	133	95	55	43	51	46	.....	.....	.....	.....	54	23	21	9	107	87
South Dakota	450	385	222	160	69	75	395	232	432	244	196	173	230	136	171	123
Tennessee	165	175	45	40	216	249	.....	1	.....	1	167	125	97	54	556	603
Texas	759	448	145	83	478	611	61	50	69	64	161	132	39	27	943	1,012
Utah	27	26	5	4	258	247	76	71	84	73	16	14	45	39	148	147
Vermont	3	1	3	.....	69	74	4	.....	4	.....	.....	.....	81	87	129	172
Virginia	112	84	95	60	198	195	4	2	5	2	82	63	119	82	517	506
Washington	207	238	22	19	218	248	76	72	89	79	10	9	55	52	112	115
West Virginia	5	3	3	5	95	79	1	.....	1	.....	21	9	24	24	129	128
Wisconsin	313	204	413	252	966	911	204	135	215	144	344	204	997	870	1,523	1,485
Wyoming	46	46	15	13	135	131	104	89	128	99	14	19	23	15	52	56
U.S. Government	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Miscellaneous (4)	1	73	.....	.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	2	.....
TOTAL	**16,205**	**12,751**	**9,294**	**6,830**	**8,905**	**9,037**	**3,474**	**2,593**	**3,922**	**2,887**	**5,176**	**4,018**	**5,145**	**4,091**	**13,981**	**14,261**

Data released Feb. 16, 1984, Farm & Industrial Equipment Institute.

(1) Includes revisions for prior months.
(2) For making bales of under 200 lbs.
(3) Pull-type, mounted, self-propelled.
(4) Sales reported as miscellaneous are retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels such as gifts to non-profit organizations, intra-plant or company transfers, etc.

Farm Tractor Horsepower in 1983:

Small tractors by state! Shifting demand for big units!

By Bill Fogarty

■WE'D BEEN waiting for this envelope to arrive for several years. It contained the 1983 retail sales numbers from the Farm & Industrial Equipment Institute which tell us industry activity by state and horsepower bracket, as usual. But this time was different, for data about tractors under 40 horsepower were included for the first time.

FIEI's reporting program on retail sales had been private, *i.e.*, for participants only, with regard to the small tractors for many years, but beginning last January, such sales were disclosed publicly: Under 20 hp; 20-29 hp; and 30-39 hp.

And now, we have the state data. (See the big table on the following pages.)

One of the first things we learn is that 65 per cent of the under-40-hp market, last year anyway, was lodged in 15 states, thus:

Texas	**6,321**
California	**2,522**
Louisiana	**2,357**
Florida	**1,976**
N. Carolina	**1,903**
Pennsylvania	**1,859**
Georgia	**1,768**
Ohio	**1,695**
Tennessee	**1,606**
Arkansas	**1,525**
New York	**1,334**
Illinois	**1,301**
Virginia	**1,275**
Alabama	**1,232**
Michigan	**1,132**
15-State Total	**29,806**

What does this tell us about markets for under-40-hp tractors? To the writer, it suggests several things:

- **Sunbelt**—Eight of the top 10 states in unit sales volume stretch across the southern half of the U.S. And sure enough, this is where one finds:
- **Small parcels** of farmland...sundown farmers.
- **Light industrial** and grounds maintenance activity stretching through all or most of the year.

The 15 states are generally high-population areas, but there are exceptions, such as Arkansas, Alabama and, in relation to its sales level, Louisiana.

This 15-state concentration, then, represents about 25 per cent of total tractor unit sales in the United States last year. It is believed that all models included in the under-40-hp reporting group are manufactured in Japan.

Big horsepower

Things have been happening in the big horsepower market. While the 100-139 horsepower size groups (two-wheel drive) have experienced a sharp decline in sales volume—from 18,711 in 1982 to last year's 14,502 units (off 22 per cent), there has been a surge in sales of two-wheel type tractors over 140 hp of 29 per cent—from 10,536 units to 13,652.

In terms of at least theoretical dollar sales of horsepower, regardless of what discounts may actually have been forged in a tough marketplace, it looks like a moderate gain, though not enough to compensate for the sharp decline in four-wheel-drive tractors.

If one scans the individual numbers on the big table with this article, a few surprises might jump out. For instance:

Arkansas is becoming a big-power tractor state as well as one of the strong sales areas for under-40-hp units. In 1982, there were 501 units sold over 140 hp and 259 of these were two-wheelers over 180 horsepower! And in 1983, there were 822 two-wheelers over 140 hp sold in Arkansas—496 of them were 180 hp or more.

Louisiana ran a somewhat similar pattern, though with less volume. Sales of over-140-hp tractors were up from 273 to 569 units. Of that 569, 322 were over 180 hp.

Meanwhile, four-wheel-drive tractor volume declined from 6,763 to 5,099 units from 1982 to 1983. This 25 per cent falloff was experienced across the board in the six states in which sales of such units are strongest:

	Retail Sales	
	1982	**1983**
North Dakota	740	491
Illinois	600	433
Kansas	515	403
Minnesota	479	386
Iowa	475	284
Montana	324	260

Most of the four-wheel-drive volume loss was in the under-250-horsepower bracket. Unit volume of over-250-hp units held about even in 1983 with 1982—1,513 vs. 1,528 units. Over 250 horsepower now comprises about 30 per cent of the total four-wheel-drive tractor market.

Summing up: Beneath all the reduced activity of the tractor market, shifts in demand have been taking place. While smaller four-wheelers have declined in popularity, bigger two-wheelers have been on the increase.

Something that needs to be established before much longer in FIEI tractor reporting is an accounting of front-wheel-assist tractors. If these can be reported as is done in Canadian reporting programs, we may be able to determine a lot more about future tractor demand trends.

Turn page for the table disclosing tractor retail sales by horsepower and by state.

1983 Retail Sales of Farm Wheel Tractors by PTO Horsepower (in units)

	Two-Wheel Drive Tractors																Four-Wheel Drive Tractors					
State	Under 20	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-119	120-129	130-139	140-159	160-179	180 & Over	Total 2-Wheel Drive	Under 200	200-249	250 & Over	Total 4-Wheel Drive	Total All Farm Wheel Tractors	State
Alabama	614	398	219	379	169	111	95	105	13	44	13	71	27	43	23	2,325	2	.....	1	3	2,328	Alabama
Alaska	47	17	.....	2	4	1	1	.....	.....	3	1	1	.....	1	.....	78	.....	.....	.....	.....	78	Alaska
Arizona	111	87	64	52	16	22	23	51	7	43	7	39	37	17	43	619	2	15	10	27	646	Arizona
Arkansas	825	486	214	442	197	250	111	64	7	33	20	111	130	196	496	3,582	10	48	81	139	3,721	Arkansas
California	1,154	1,212	156	308	303	499	441	286	67	144	50	137	93	102	88	5,040	42	77	95	214	5,254	California
Colorado	244	240	50	65	67	50	28	46	8	50	26	82	98	57	77	1,188	28	39	59	126	1,314	Colorado
Connecticut	171	133	50	35	32	30	8	16	.....	7	.....	6	2	.....	1	491	.....	-1	-1	-2	489	Connecticut
Delaware	61	48	12	14	9	6	18	8	4	30	12	14	6	9	7	258	3	1	.....	4	262	Delaware
Florida	1,083	618	275	365	201	313	285	220	12	97	28	50	41	31	23	3,622	37	29	2	68	3,690	Florida
Georgia	740	613	415	597	272	252	153	135	17	75	45	134	87	55	70	3,660	1	3	2	6	3,666	Georgia
Hawaii	28	40	1	19	24	7	14	4	1	.....	1	.....	2	.....	.....	141	.....	.....	.....	.....	141	Hawaii
Idaho	95	78	21	53	40	52	28	74	31	93	67	127	90	85	79	1,013	57	35	39	131	1,144	Idaho
Illinois	758	444	99	173	164	211	151	198	28	279	154	644	483	440	432	4,658	170	125	138	433	5,091	Illinois
Indiana	591	359	68	212	116	134	74	133	31	166	98	277	190	194	194	2,837	87	50	60	197	3,034	Indiana
Iowa	298	191	55	88	137	244	161	303	47	461	281	721	562	358	242	4,149	141	80	63	284	4,433	Iowa
Kansas	349	227	72	87	58	86	67	137	36	229	128	344	272	231	252	2,575	170	141	92	403	2,978	Kansas
Kentucky	431	425	245	697	458	295	176	250	25	54	21	64	38	33	32	3,244	8	7	6	21	3,265	Kentucky
Louisiana	1,063	1,078	216	475	134	183	198	63	12	85	30	37	73	174	322	4,143	18	24	22	64	4,207	Louisiana
Maine	224	137	29	35	37	28	10	14	1	13	2	10	3	3	3	549	1	.....	.....	1	550	Maine
Maryland	517	276	81	120	107	82	36	65	16	44	16	37	17	11	15	1,440	7	3	7	17	1,457	Maryland
Massachusetts	179	164	37	31	36	22	27	13	1	2	3	1	.....	1	.....	517	.....	.....	.....	.....	517	Massachusetts
Michigan	642	432	58	139	151	167	137	167	26	160	85	188	116	71	30	2,569	83	29	31	143	2,712	Michigan
Minnesota	264	143	34	73	70	200	128	312	56	350	197	435	380	262	125	3,029	174	121	91	386	3,415	Minnesota
Mississippi	388	435	189	372	121	179	122	92	12	45	17	99	117	129	254	2,571	5	12	14	31	2,602	Mississippi
Missouri	669	307	116	283	167	273	137	255	41	164	62	219	128	122	143	3,086	47	36	35	118	3,204	Missouri
Montana	109	80	63	66	28	77	23	81	14	76	65	56	44	47	32	861	91	79	90	260	1,121	Montana
Nebraska	96	96	20	36	22	53	43	145	27	256	142	367	309	265	244	2,121	74	53	41	168	2,289	Nebraska
Nevada	29	16	3	1	3	7	2	5	.....	5	.....	2	4	1	1	79	3	1	.....	4	83	Nevada
New Hampshire	202	155	16	45	30	18	12	14	6	3	2	2	.....	.....	.....	505	.....	.....	.....	.....	505	New Hampshire
New Jersey	307	242	41	64	44	15	13	19	5	18	2	5	3	2	1	781	1	.....	.....	1	782	New Jersey
New Mexico	49	85	47	57	23	15	35	14	1	20	9	26	14	19	7	421	1	7	4	12	433	New Mexico
New York	770	475	89	159	199	254	154	312	54	126	50	109	44	23	7	2,825	33	8	13	54	2,879	New York
North Carolina	843	611	449	683	321	321	129	243	24	100	52	105	63	51	77	4,072	7	1	4	12	4,084	North Carolina
North Dakota	78	52	11	8	17	21	17	46	20	151	132	233	212	202	154	1,354	206	147	138	491	1,845	North Dakota
Ohio	1,073	526	96	197	232	196	177	196	23	171	80	197	129	112	70	3,475	74	27	27	128	3,603	Ohio
Oklahoma	541	398	111	227	130	115	129	139	26	165	78	196	133	92	77	2,557	85	76	57	218	2,775	Oklahoma
Oregon	534	290	67	163	101	96	51	66	19	56	13	67	43	20	15	1,601	24	16	16	56	1,657	Oregon
Pennsylvania	1,184	521	154	245	252	323	120	252	38	146	48	77	29	26	10	3,425	18	3	3	24	3,449	Pennsylvania
Rhode Island	24	25	5	3	.....	3	1	1	1	.....	.....	1	.....	.....	.....	64	.....	.....	.....	.....	64	Rhode Island
South Carolina	411	287	133	209	77	78	52	105	3	26	9	48	17	20	49	1,524	5	1	4	10	1,534	South Carolina
South Dakota	28	21	2	6	12	41	29	125	32	232	142	228	155	131	46	1,230	100	59	62	221	1,451	South Dakota
Tennessee	661	568	377	717	439	432	112	141	15	49	16	104	63	55	54	3,803	8	1	11	20	3,823	Tennessee
Texas	2,835	2,535	951	1,776	1,027	1,115	535	470	69	418	159	606	374	373	543	13,786	88	86	134	308	14,094	Texas
Utah	128	88	13	43	85	73	30	54	9	46	22	24	24	10	6	655	5	6	10	21	676	Utah
Vermont	107	73	14	26	41	37	16	53	4	14	5	10	10	3	1	414	1	.....	.....	1	415	Vermont
Virginia	654	452	179	422	256	201	95	170	21	95	19	51	24	20	18	2,677	2	4	.....	6	2,683	Virginia
Washington	401	317	83	322	304	189	96	80	8	31	17	35	37	21	10	1,951	52	39	34	125	2,076	Washington
West Virginia	128	72	40	84	56	46	17	19	4	8	2	4	.....	.....	.....	480	1	.....	.....	1	481	West Virginia
Wisconsin	237	139	41	88	155	361	211	522	82	328	151	226	179	94	93	2,907	83	19	13	115	3,022	Wisconsin
Wyoming	34	31	7	18	16	18	20	31	10	23	9	26	14	8	12	277	20	1	4	25	302	Wyoming
U.S. Government	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	.....	4	.....	1	.....	1	5	U.S. Government
Miscellaneous	29	25	4	69	101	32	239	43	.....	9	17	.....	16	12	9	605	.....	2	1	3	608	Miscellaneous
TOTAL	**23,039**	**16,770**	**5,792**	**10,850**	**7,061**	**7,834**	**4,967**	**6,357**	**1,014**	**5,243**	**2,606**	**6,853**	**4,933**	**4,232**	**4,487**	**111,838**	**2,075**	**1,511**	**1,513**	**5,099**	**116,937**	**TOTAL**

DATA: Farm & Industrial Equipment Institute. Figures do not include garden tractors, motor tillers, or contractor's off-highway types. Report includes units marketed by these firms: Allied Farm Equip. (Leyland, Satoh); Allis-Chalmers; Belarus; J I Case; Deere; Deutz; Ford; International Harvester; Long; Massey-Ferguson; Steiger; Versatile; R.M. Wade (Satoh); and White. Sales reported as miscellaneous are retail sales which cannot be classified by state or as U.S. Government. They include sales and dispositions that do not go through usual marketing channels such as gifts to non-profit organizations, intra-plant or company transfers, etc.

Turn page for: **FARM TRACTORS**, Makes & Models on the 1984 North American Market

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An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

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Tulsa, Okla.
February 25, 1984

ALLIS-CHALMERS TRACTORS

HD-6 dozer, 1959 (Good)	5900
HD-6 dozer, 1961 (Fair)	4400*

DAVID BROWN TRACTOR

1210 diesel, 1974 (Good)	5250

FERGUSON TRACTORS

20, 1949 (Fair)	925
20, 1950 (Good)	1750
20, 1951 (Good)	1575

FORD TRACTORS

9N, 1940 (Rough)	775
9N, 1941 (Good)	1250
9N, 1942 (Good)	1350
9N, 1942 (Fair)	850
9N, 1943 (Fair)	1100
9N, 1944 (Good)	1150*
9N, 1944 (Fair)	1025
9N, 1945 (Fair)	975*
9N, 1946 (Good)	1150
8N, 1947 (Rough)	1000*
8N, 1948 (Fair)	1175
8N, 1948 (Good)	1500
8N, 1949 (Good)	1500
8N, 1949 (Good)	1250*
8N, 1949 (Fair)	1025
8N, 1950 (Rough)	900
8N, 1950 (Good)	1600*
8N, 1951 (Good)	1925
8N, 1952 (Good)	1850
8N, 1952 (Good)	1950
NAA, 1953 (Good)	2300
NAA, 1953 (Fair)	1700
NAA, 1954 (Good)	2500
850, 1956 (Good)	2750
801 diesel, 1959 (Good)	2850
801, 1960 (Fair)	1950*
900, 1959 (Fair)	900
3000 diesel, 1967 (Good)	3100
3000 diesel, 1968 (Good)	3250
3000, 1970 (Good)	3400
3000 diesel, 1971 (Good)	3850
3000 diesel, 1972 (Good)	4100
3500, ldr., 1967 (Good)	3900
3600 diesel, 1982 (Excellent)	7590
4000 diesel, 1966 (Good)	3100
4000 diesel, 1967 (Good)	3250
4000 diesel, ldr., 1967 (Good)	3450
4000, ldr., 1969 (Fair)	3425
5000 diesel, 1967 (Good)	4700
5000 diesel, 1970 (Fair)	4450*
8000 diesel, 1967 (Rough)	2750

JOHN DEERE TRACTORS

70 diesel, 1953 (Good)	1800
70 diesel, 1955 (Good)	1450*
430, mo., 1959 (Good)	1800
1020 diesel, 1970 (Good)	3900
300 diesel, 1960 (Fair)	3250*
3010 diesel, 1962 (Good)	4100
4010 diesel, 1963 (Good)	4600
4020 LP, 1968 (Good)	3560
400 diesel, backhoe, 1969 (Good)	5100
2640 diesel, 1976 (Good)	8950
4230 diesel, duals, 1980 (Excellent)	21,100*
2050 diesel, 1983 (New)	14,500*
2050 diesel, 1983 (New)	14,500*

MASSEY-FERGUSON TRACTORS

35 diesel, 1960 (Good)	2700
35 diesel, 1962 (Good)	3050
50, 1961 (Fair)	2100
65 diesel, 1960 (Good)	2420
65 diesel, 1962 (Good)	2600
65 diesel, ldr., 1964 (Good)	2450*
135 diesel, 1965 (Good)	3100*
135 diesel, 1967 (Good)	3300
135 diesel, 1970 (Good)	3700
165 diesel, 1969 (Good)	3700
165 diesel, ldr., 1970 (Good)	4200
165 diesel, nf., 1970 (Fair)	2900
165 diesel, 1970 (Good)	4500
165 diesel, ldr., 1972 (Good)	6200
175 diesel, 1971 (Good)	4450
180 diesel, 1970 (Good)	4200
240 diesel, 1982 (New)	7500*
250 diesel, 1982 (New)	8850
245 diesel, 1981 (Excellent)	7100
265 diesel, 1979 (Good)	7950
275 diesel, 1981 (Good)	8400
282 diesel, 1983 (New)	9750
1085 diesel, ldr., 1978 (Good)	9500
1155 diesel, duals, 1975 (Salv.)	2700

MINNEAPOLIS-MOLINE TRACTORS

670, 1967 (Good)	2200*
1350 LP, 4WD, 1970 (Good)	5100*

OLIVER TRACTORS

1850, LP, 1965 (Good)	2600
1850 diesel, 1968 (Good)	3750

LEYLAND TRACTOR

384 diesel, 1967 (Salv.)	650

INTERNATIONAL HARVESTER TRACTORS

Cub, mo., 1957 (Good)	1500*
Cub, mo., plow, 1959 (Good)	1475
Cub Loboy, mo., 1959 (Good)	1550
Cub Loboy, mo., 1965 (Good)	1600*
154, mo., 1966 (Good)	2000
154, mo., 1969 (Good)	2550
185, mo., 1972 (Good)	2750*
185, mo., 1974 (Good)	2650
240, 1958 (Fair)	950
300 diesel, 1963 (Good)	2200
424, 1966 (Good)	2100*
574, 1971 (Good)	3900
674 diesel, 1975 (Fair)	3300*

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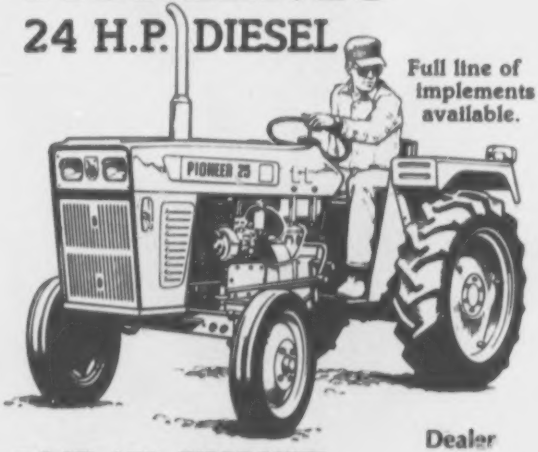

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1066, 1972 (Good)	6250*
1456, 1970 (Good)	6200*
1466, 1972 (Good)	6900*

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Archbold, Ohio
February 13, 1984

INTERNATIONAL HARVESTER TRACTORS

Sup. A, mo., 1951 (Fair)	1900
Sup. A, bld., 1952 (Fair)	1400*
Cub, cult., 1960 (Rough)	960
Cub, bld., 1960 (Fair)	1675
SH, 1953 (Good)	685
M,	375
M,	250
M, 1950 (Fair)	675
M, 1949 (Rough)	550
M, 1950 (Fair)	650
M, 1948 (Fair)	750
Sup. M, 1952 (Fair)	800*
Sup. M, 1952 (Rough)	775
70 diesel, hydro, 1974 (Fair)	4300
W6, 1955 (Good)	1150
300, 1956 (Fair)	1125
350, bld., 1959 (Rough)	875
400, 1955 (Fair)	1100
400 diesel,	450
400 diesel	500
B414, (Good)	2300
450, 1958 (Rough)	875*
450 diesel, 1957 (Fair)	1350
450, 1957 (Fair)	1300
450, 1958 (Rough)	1060
450, 1956 (Fair)	1450
450 diesel, 1957 (Fair)	950*
460, 1959 (Rough)	1225
504,	900
504, 1964 (Fair)	2000*
2504, (Rough)	1260
560, 1960 (Fair)	1890*
560, 1961 (Rough)	1700
560, 1959 (Rough)	1775*
560, 1962 (Fair)	1925
560, 1960 (Fair)	2450
560, 1960 (Good)	2250*
574, ldr., 1972 (Fair)	5100
2606, ldr., 1965 (Fair)	2975
656, hydro, 1970 (Fair)	3275
656, 3-pt., 1966 (Good)	3300
656, 1969 (Good)	4200*
656, hydro, 1968 (Fair)	2800*
706, 1965 (Fair)	2650*
706, 1964 (Fair)	2400
706, 1966 (Fair)	1800
706, 1961 (Fair)	1950*
706, 1963 (Fair)	2650*
706, 1963 (Fair)	3250
706, 1973 (Fair)	3150
706, 1964 (Fair)	2400
706, 1966 (Fair)	3450
706 diesel, 1965 (Fair)	2450
706 diesel, 1963 (Fair)	3225
756, 1971 (Rough)	4000
766 diesel, 1975 (Fair)	4750*
806 diesel, 1965 (Fair)	3750
806 diesel, 1961 (Rough)	3475
806 diesel, 1967 (Good)	4250
806 diesel, 1967 (Good)	5600*
806 diesel, 1966 (Good)	4900
806, 1969 (Fair)	5600
806, 1965 (Fair)	2850
806 diesel, 1965 (Fair)	4125
806 diesel, 1967 (Fair)	5900
806, 1C67 (Good)	4650
856 diesel, 1970 (Good)	6400
856 diesel, 1967 (Fair)	6300*
856 diesel, 1968 (Fair)	5900*
856, 1970 (Fair)	6700*
966, 1975 (Fair)	8000
966, 1975 (Good)	8000
966, 1973 (Good)	8350
1066, 1970 (Fair)	7450
1066, 1971 (Fair)	6950
1066 diesel, 1974 (Excellent)	9600*
1066, 1975 (Good)	8200
1066, 1976 (Good)	7950
1066, 1975 (Good)	8550
1066, 1975 (Good)	9600*
1066, 1976 (Excellent)	9200*
1066, 1976 (Good)	9500
1206 diesel, 1966 (Fair)	4100*
1206 diesel, 1965 (Fair)	3900
1206 diesel, 1965 (Good)	4900*
1256, 1970 (Fair)	6100*
1256 diesel, 1970 (Rough)	3000*
1256, 1968 (Good)	6800
1456, 1970 (Good)	6325
1466, 1973 (Good)	8500
4166, 1972 (Fair)	7050
3588, 1981 (Good)	19,000

OLIVER TRACTORS

77, (Rough)	150*
88, 1955 (Rough)	550*
1550, 1965 (Fair)	3750
1550 diesel, 1965 (Rough)	2400
1600 diesel, 1961 (Rough)	2050*
1600, 1961 (Fair)	1775
1650 diesel, 1967 (Fair)	1875
1650 diesel, 1966 (Fair)	3450
1750 diesel, 1965 (Good)	3400
1800, 1963 (Fair)	2200*
1850 diesel, 1965 (Fair)	4250
1850, 1965 (Fair)	2200*
1855, 1968 (Fair)	4300*
1950-T, 1968 (Good)	4600
1950-T, 1967 (Rough)	4100*
55, 1952 (Fair)	1250
66, 1950 (Rough)	485
60,	155
70, 1941 (Rough)	375

JOHN DEERE TRACTORS

A, 1949 (Rough)	775*
A, bld., 1948 (Rough)	500
B, 1943	225
G, 1951 (Fair)	950*
MT, 1948 (Fair)	975
40, 1956 (Rough)	575
50, 1955 (Fair)	1100*
70 diesel, 1955 (Rough)	550*
70, 1954 (Rough)	275*
70, 1954 (Fair)	910
70 diesel, 1954 (Fair)	1050*
60, 1956 (Fair)	875
720 diesel, 1957 (Fair)	1800
730 diesel, 1959 (Fair)	1350*
730 diesel, 1959 (Good)	2650
850 diesel, 1977 (Good)	4700*
1010 diesel, 1962 (Rough)	2400
2010, 1961 (Fair)	1975
2010, ldr., 1964 (Rough)	2400
2010, 1961 (Fair)	2200*
2020 diesel, 1972 (Rough)	3900
2020 diesel, 1972 (Rough)	3000
2030 diesel, 1973 (Fair)	2600*
2030 diesel, 1973 (Fair)	2650
2130 diesel, 1974 (Fair)	6150
2510, 1968 (Rough)	3050
2630, 1975 (Fair)	9000
3010, 1961 (Fair)	2850
3120,	6500
3020 diesel, 1972 (Fair)	2700*
3020 diesel, 1968 (Fair)	5450
3020, 1965 (Good)	3850
3020, 1968 (Good)	5100*
3020, 1966 (Good)	3550
3020 diesel, 1968 (Fair)	4650
4010 diesel, 1962 (Good)	4000*
4020 diesel, 1966 (Fair)	6000*
4020 diesel, 1964 (Fair)	4300*
4020 diesel, 1968 (Fair)	4300*
4020 diesel, 1966 (Fair)	5700*
4020 diesel, 1969 (Fair)	8000
4020 diesel, 1968 (Good)	6500
4020, 1966 (Good)	5850*
4020 diesel, 1966 (Fair)	5650

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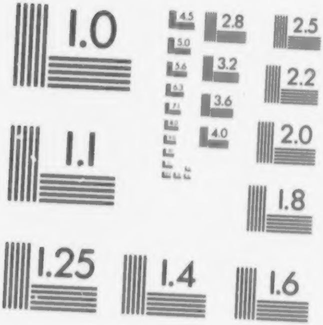
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The business magazine of the farm & industrial equipment industry

May 1984

TWO DOLLARS

Implement &Tractor

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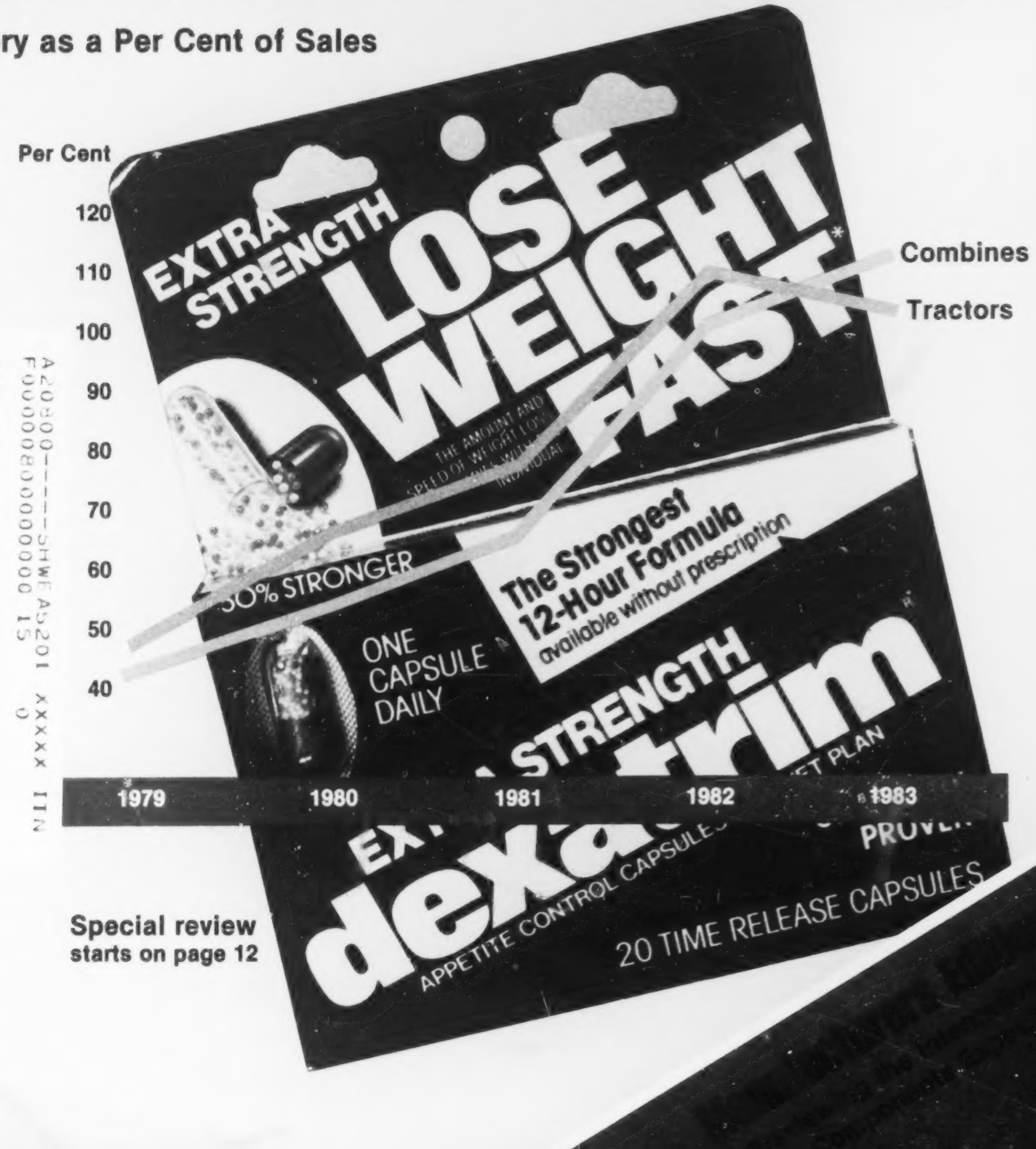
Inventory as a Per Cent of Sales



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Special review
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Editorial, advertising
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Bill Fogarty, Editor
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Irma Allread, Associate Editor
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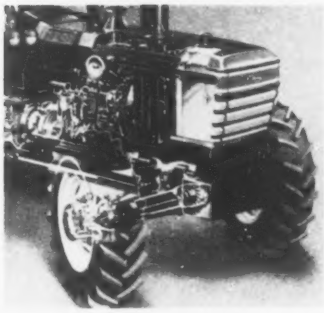

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CAN YOU JUSTIFY A COMPUTER ON YOUR FARM?
Ag Disk

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10: Why Nebraska Won't Get Dirty. An explanation of the reasons dirt-farmin' tractors get rated on a concrete test pad.

12: Reviewing Major Inventories. How successfully does discounting cut the real burden of carrying inventory?

16: Two Fast Looks at Front-Wheel Assist. Some figures on the market share grabbed by FWA tractors, and the start of a series on making the machines perform their best.

20: Dutch Diversity. The Amsterdam show presents a broad range of equipment for a very sophisticated agriculture.

24: Moving the Market Toward Planned Purchase. It will take some effort to change the farmer's thinking, but it's a must, says A-C President Roy Uelner.

31: I&T Job Match. Listings of jobs wanted and positions available through the I&T Job Match program.

32: Vegetable Oils Into Ag Fuel. Research continues, and eventually we'll need the results.

36: Are Computers the Next Big Shortline? Some dealers are finding out if there really is a market for on-farm computers.

On the cover... The industry's effort to shed excess baggage moves slowly. Like weight-loss capsules, radical moves to cut inventory may produce side effects.

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I&T Update

Sales Strength in Big-Tractor Brackets

The March flash report from the Farm & Industrial Equipment Institute shows a continued mix of ups and downs. Four-wheel-drive tractor sales are continuing their pickup. Two-wheel-drive tractor sales continue to show great strength in the over-140-hp group and weakness from 100-139 hp. Meanwhile, the improvement in 40-99 hp sales suggests to some observers that surging popularity of front-wheel-assist may be contributing to all three movements. Sales of under-40-hp fell off in March, but March of 1983 had produced a big surge over 1982 volume in that bracket.

The flash report:

	Unit Retail Sales					
	March			January-March		
	1984	1983	Pct. Change	1984	1983	Pct. Change
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	4,189	4,712	−11.1	8,997	9,086	− 1.0
40-99 hp	3,693	3,194	+15.6	9,485	8,258	+14.9
100-139 hp	983	1,176	−16.4	2,309	3,598	−35.8
Over 140 hp	1,288	854	+50.8	3,522	2,313	+52.3
Total 2-wheel drive	**10,153**	**9,936**	**+ 2.2**	**24,313**	**23,255**	**+ 4.5**
4-wheel drive						
Under 200 hp	165	145	+13.8	436	406	+ 7.4
Over 200 hp	349	245	+42.4	762	568	+34.2
Total 4-wheel drive	**514**	**390**	**+31.8**	**1,198**	**974**	**+23.0**
Total All Tractors	**10,667**	**10,326**	**+ 3.3**	**25,511**	**24,229**	**+ 5.3**
S-P Combines	306	602	−49.2	2,012	3,106	− 35.2
Balers (under 200-lb. bales)	553	515	+ 7.4	1,149	1,231	− 6.7
Forage Harvesters (shear-bar type)	136	158	−13.9	363	475	−23.6
Mower-Conditioners	899	809	+11.1	1,891	1,779	+ 6.3

Allis-Chalmers '83: Sales of $512 Million

Allis-Chalmers Corp.'s annual report has indicated that 1983 sales of agricultural and material handling equipment were $512 million, compared with $603 million in 1982. The corporation's total sales were $1.3 billion compared with $1.61 billion in 1982.

Loss before income taxes by the agricultural and material handling equipment segment was $36 million compared with $152 million in 1982. In addition, finance expense for the segment was $71 million; in the previous year, it was $89 million.

The over-all company experienced a loss of $119 million, compared with a loss of $235 million in the previous year.

Search for Oldest MF Tractor Is Launched

In 1983, Allis-Chalmers launched a search for the oldest working Gleaner combine. Now, Massey-Ferguson is conducting a worldwide search for the oldest working MF tractor. It's part of a commemoration of the 100th birthday of Harry Ferguson, inventor of the Ferguson system, and the 50th anniversary of the first prototype tractor using the system.

Owner of the oldest Ferguson in the U.S. will win $1,000, a 34-hp MF 240 tractor and a trip to Toronto and to the Smithfield Agricultural Exhibition in London next December.

MF Cuts Losses To $68 Million

Massey-Ferguson Ltd. has reported a net loss for the fiscal year ended Jan. 31, 1984, of $68 million. A news release from MF compares this with a net loss of $413 million for the fiscal year ended Oct. 31, 1982. The company had changed its year ending from the last of October to the last of January.

Total sales were $1.535 billion, down 25 per cent from $2.058 billion in fiscal 1982. Sales in 1983 did not include deconsolidated subsidiaries in Argentina and Brazil. Farm and industrial equipment sales were off 22 per cent at $1.292 billion; diesel engine sales of $243 million were off 39 per cent.

In North America, sales were down 3 per cent at $492 million; European volume fell 15 per cent to $667 million; sales in Asia, Africa and Australasia were off 27 per cent at $339 million; sales in Latin America were $37 million, down from $304 million.

The three months ended Jan. 31, 1984, produced sales of $362 million, up 16 per cent. The period's net loss was $27 million compared with $94 million in the same three months a year earlier.

Briefly...

John N. Chuchman, marketing manager of Ford Tractor's North American sales operations, has been named Agricultural Marketer of the Year by the National Agri-Marketing Assn.

International Harvester Co. has sold a telecommunications system, whose voice and data services it once intended to put on the open market, to ICOM, Parsippany, N.J.

World Tractor Sales, Output Estimated

Writing in the March, 1984, issue of Britain's *Agricultural Machinery Journal*, Dr. Sandro Mangosi estimates that tractor sales outside the Communist economic bloc fell from 816,700 units in 1976 to 648,900 in 1982, a 20 per cent drop.

Dr. Mangosi, formerly a Massey-Ferguson market research manager and now SAME Trattori's marketing manager, presented a table estimating 1982 tractor production, worldwide, by "major" company, thus:

Massey-Ferguson, 104,000; Fiat, 82,000; Ford, 73,000; International Harvester, 70,000; Deere, 62,000; Deutz, 25,000; SAME, 25,000; Case, 21,000; Fendt, 15,000; Volvo/Valmet, 14,000; Renault, 13,000; Steyr, 11,000.

Canadian Sales: Tractors Up, The Rest, Down

Canada's tractor sales in the first quarter of 1984 showed a unit sales increase of 11 per cent—from 3,287 to 3,653. Four-wheel-drive units improved by 18 per cent to 606 units, but over-100-hp, two-wheel-drive models were off 16 per cent. The major surge was felt in the 40-99 horsepower bracket—up 29 per cent to 1,618 units. Tractors under 40 hp went up 20 per cent to 508 units.

Sales of self-propelled combines were up 6 per cent for the quarter to 298 units, but March was down severely, from 93 units in 1983 to 45. Declines were also noted in other product categories for the first quarter: pull-type combines, down 31 per cent at 135 units; small balers, off 5.6 per cent at 255; big balers, off 17 per cent at 258; mower-conditioners, down 19 per cent at 224; forage harvesters, down 59 per cent at 43; pull-type swathers, down 30 per cent at 108; self-propelled swathers, down 14 per cent at 208.

Well, those are terrible one-liners, aren't they! If Butrick were here, he'd tell me to consider selling my comedy act.

Actually, I may be clowning on this selling-out business to keep from crying. I have mixed feelings about splashing Butrick's list around so liberally. He's been doing this kind of consulting for many years and his observations deserve some attention and consideration.

But in the context of today's troubled farm equipment business, when I read Butrick's remarks, however astute they are, I have an emotional reaction—sadness—rather than an intellectual one. Talk of selling out suggests to me that there is a collapsing need for farm equipment dealers (and small manufacturers) and that such business owners are best off unloading fast, salvaging what they can and finding something else to do. It's just my gut reaction, and it's unfair, because Butrick's points are generally pertinent whether the economy is good or bad, expanding or contracting.

Frankly, I'm one of the ones who is beginning to feel that there are not enough farm equipment dealers out there—*not enough to take care of the machinery needs of farmers in a true sense,* not enough to capitalize on the real power equipment opportunities that exist.

Yes, I know about the troubles everybody has been having. I know about dealer attrition and marketing costs and reduced demand for tractors and farm income problems.

But I also know about the mass merchandisers who took over so much of the farm equipment parts business without a great struggle on the part of manufacturers and dealers. If the parts distribution and marketing job had been getting as much attention as it deserved, and farmers' true needs in this regard had been met, there would be a lot more sustaining cash coming into this business today.

I also know that it's possible to run a dealership service department profitably, but that many dealers don't, or didn't. If service operations had been a higher concern of manufacturers and had been managed properly by more dealers—again, meeting farmers' true machinery needs—there would be more income and less attrition.

And I also feel that some of the dealer attrition of the last year or two is less a result of soft demand itself than of manufacturers misjudging the mood of farmers and farm bankers, and grossly overproducing for the market. Hard times would surely have taken out some dealers. But without the horrible draining-off of cash from this whole industry to pay the interest on all that debt, many other dealeships and many jobs could have been saved.

Anyone else I should take a whack at? Bankers? That would take too long, so I'll save it for some other time. How about myself?

Okay: I've been told a time or two that in this column I pussyfoot too much on some issues. If that's true, and if I have thereby contributed to *unnecessary* dealer attrition in any way, I apologize. At this point, I hereby lob the ball into the reader's court and ask for your opinions: Have there been more dealership wipeouts than economic conditions warrant? Should manufacturers be diverting more money to building up their dealer organizations, both qualitatively and quantitatively?

If you feel like responding, write me at Box 12901, Overland Park, Kan. 66212, or phone me at 913/888-4664.

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

YODER & FREY, INC.
Archbold, Ohio
March 12, 1984

INTERNATIONAL HARVESTER TRACTORS

B,	450
Sup. A, 1947 (Rough)	725
Sup. A, 1948 (Rough)	1025
184, 1976 (Fair)	2800*
H, 1943 (Rough)	425*
H, 1950 (Fair)	900
H, 1949 (Rough)	475
H, 1946 (Fair)	800*
H, 1949 (Rough)	1000
H, 1941 (Fair)	500
SH, 1952 (Rough)	600*
SH, 1952 (Good)	1225*
M,	975
M, 1952 (Fair)	1050
M, 1947 (Fair)	950
M, 1948 (Rough)	425
Sup. M,	875
W6, 1950 (Rough)	600
140, 1960 (Fair)	3300
140, 1972 (Fair)	2450*
100, 1955 (Fair)	2500
100, 1955 (Fair)	2440
300, 1955 (Rough)	725
354, (Fair)	1250*
Sup. C, 1953 (Fair)	975
400 diesel, 1954 (Fair)	675
400, 1957 (Fair)	1000
450 diesel, 1958 (Rough)	800*
450, 1957 (Rough)	775*
454, 1972 (Fair)	2250
460 diesel, 1960 (Fair)	1700
560, 1960 (Rough)	1600*
560 diesel, 1961 (Good)	2775*
560, 1959 (Fair)	1500
560, 1962 (Good)	2200
560, 1958 (Fair)	1800
560, 1960 (Fair)	1850*
560 diesel, 1961 (Fair)	1900*
560, 1959 (Rough)	1550*
656, 1968 (Fair)	2700*
656, 1969 (Fair)	3400
656, 1970 (Good)	3200*
706, 1965 (Fair)	3850
706, 1965 (Good)	3800
706, 1964 (Fair)	2100
706 diesel, 1964 (Good)	4600*
706 diesel, 1966 (Fair)	3200
706, 1964 (Fair)	1700*
756, 1968 (Good)	3750
766 diesel, 1974 (Fair)	4700
786, 1976 (Fair)	6700
806 diesel, 1965 (Fair)	5850
806 diesel, 1965 (Good)	5400
806, 1964 (Rough)	4150
806, 1963 (Fair)	4300*
806 diesel, 1967 (Fair)	3750
826 diesel, 1970 (Fair)	6600
856 diesel, 1969 (Good)	6900
856 diesel, 1969 (Good)	6500
856, 1970 (Good)	6100*
856, 1967 (Fair)	5600
856 diesel,	6500
856, 1970 (Fair)	6200*
856, 1971 (Good)	6300*
856 diesel, 1970 (Good)	5750
884, 1976 (Good)	11,750
966, 1973 (Fair)	5250*
986, 1978 (Fair)	11,000*
1066, 1972 (Fair)	8400
1066, 1974 (Good)	7250
1066, 1975 (Good)	8550
1066, 1975 (Fair)	6650
1066, 1975 (Rough)	4100*
1066, 1971 (Fair)	7800
1086, 1977 (Good)	17,000
1086, 1976 (Good)	12,800*
1086, 1977 (Good)	12,800*
1086, 1979 (Excellent)	14,600
1206, 1966 (Good)	6350
1206 diesel, 1964 (Fair)	4600*
1206 diesel, 1966 (Fair)	5850*
1206, 1964 (Fair)	4100
1256, 1970 (Rough)	4750*
1256, 1970 (Good)	6400
1456, 1970 (Good)	7375
1456, 1971 (Rough)	5200
1456, 1967 (Fair)	5300*
1456 diesel, 1969 (Fair)	5500
1466, 1972 (Rough)	4700*
1466, 1976 (Good)	10,500*
1466, 1972 (Fair)	8100*
1466 diesel, 1972 (Fair)	7000
1566 diesel, 1973 (Good)	8250*
1566, 1975 (Fair)	10,000*
3588, 1980 (Good)	15,900*
3588 diesel, 1979 (Good)	18,000*
3088, 1982 (Excellent)	18,000*

(Continued on page 40)

Reviewing Major Inventories

They've been trimmed, but not as fast as sales have fallen. How successfully does discounting cut the real burden of carrying inventory? *By Bill Fogarty*

■"WHAT!!," cried the man with whom I was sharing a taxi. "You mean they haven't cleaned that inventory up yet? What have they been *doing* in your industry?"

This man and I had discovered that we were both headed from the Atlanta airport to a major conference-exhibition of the fasteners industry, and we had begun talking shop. He took the news about the high inventories of the farm equipment industry to heart, for he had hoped to sell some nuts and bolts, or whatever, to tractor makers in 1984.

By the time you read this, perhaps we'll all know if that fastener man can smile again sometime in the foreseeable future. Meanwhile, supply levels are generally well beyond demand in many high-ticket equipment areas.

The big table on the opposite page provides a quick glimpse of how it's been going over the past 21 quarters with regard to the inventory of major machines. Each December has its own color, each March, etc., so you can compare easily on a year-to-year basis for each quarter.

In addition, we invite your inspection of the table below. This one indicates the relevance of the inventory levels, for it briefly relates them to sales.

How can it be?

Inventories staying so high produce plenty of grief and anxiety, but also astonishment. Many people, like the man in the taxi, wonder how companies can keep producing in the face of a pre-existing glut. It seems simple enough: If more tractors roll off the factory line, or are lifted off the deck of a container ship, than roll off the dealer's truck into a farmyard, inventory will go up. And so will profit-robbing interest payments. So the trick would seem to be, just don't make any more.

But there are complications. The obvious one is an unexpected drop in demand or the failure of an expected upturn to materialize. Such situations are made more difficult when production schedules are cast in concrete far in advance. With imported machines, commitment to produce is established even earlier.

Another complication might be that the models/options that are the bright sellers in an otherwise dreary marketplace aren't the ones the experts expected to be hot. Case in point:

Another article in this issue tells of the big surge in market share of tractors with mechanical front-wheel drive. Would you have believed that about 10 per cent of the 100 to 140 horsepower units sold in the U.S. last year would go with front-drive systems on them? I would have underestimated the demand, and I'll bet some others actually did. Meanwhile, conventional versions may have gathered dust.

There was an article in the Mar. 29 *Wall Street Journal* about current inventories in American business. It told how low inventories are in many fields—bicycles, tires, autos—and low by design, too. Many businesses are saving big money in interest and storage costs by keeping the lowest inventory-to-sales ratios in more than a decade, thanks to computer advancements.

But, the article tells us, the big test is still to come. Shortages might erupt by mid-year and this will test the resolve of executives. One of the perils is that if they yield to pressure to build up inventory so as not to miss out on increasing demand, there could be a scramble for supplies, heavier borrowing, and a rise in prices and interest rates.

For somebody in the farm equipment industry, it has a far-away ring to it. It's a world only dimly remembered for veterans of this business. There was heavy borrowing, a scramble for supplies and rocketing inflation back in 1973 and 1974. The industry's leaders didn't understand at the time that their resolve was being tested (but neither did anyone else) and inventory growth in relation to demand really got rolling.

The capsule box

To symbolize the farm equipment industry's desire to trim excess inventory, I&T purchased a box of over-the-counter appetite control capsules, photographed it and placed it on the cover of this issue.

These capsules are intended as a

(More...)

Inventory as a Per Cent of Sales

	Tractors (40 HP and over)			Self-Propelled Combines		
Year	Average Inventory	Sales	Inventory as a Pct. of Sales	Average Inventory	Sales	Inventory as a Pct. of Sales
1979	67,693	138,990	49	13,969	32,246	43
1980	75,777	119,336	66	13,713	25,741	53
1981	79,960	103,835	77	16,442	26,831	62
1982	77,170	70,381	110	16,168	16,205	100
1983	66,937	66,237	101	14,187	12,751	111

Source: Farm & Industrial Equipment Institute Retail Sales Reports, 1979-1983

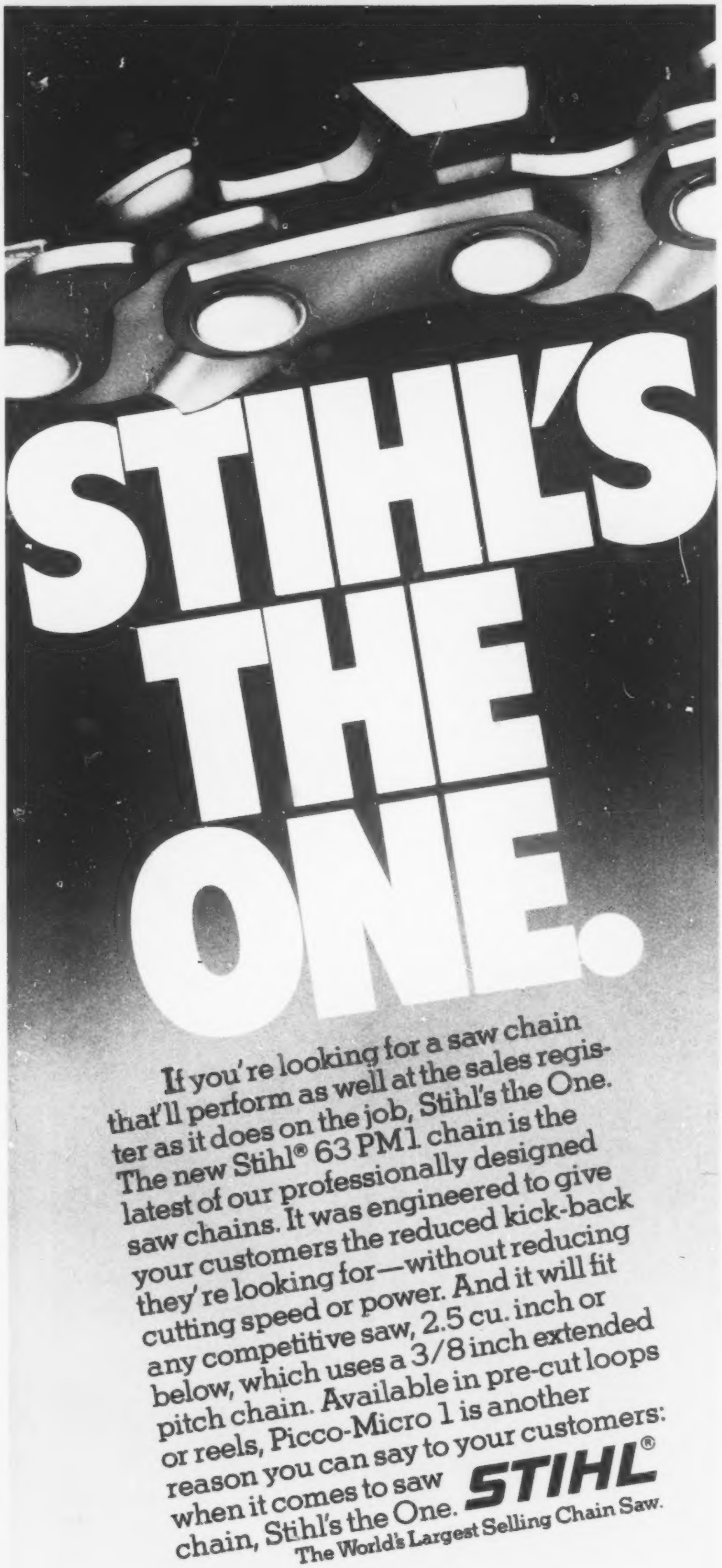
Industry Inventories, Dec. 31, 1978-Dec. 31, 1983

Farm Tractors 40 HP and Over

Last Day of	40-99 HP	100 HP & Over	4-Wheel Drive	Total Tractors	S-P Combines
Dec., 1978	32,501	26,504	4,723	63,728	9,161
Mar., 1979	33,712	27,845	4,945	66,502	13,712
June, 1979	31,893	25,612	5,096	62,601	17,454
Sept., 1979	34,192	30,017	6,286	70,495	16,370
Dec., 1979	37,881	27,197	6,098	71,176	8,339
Mar., 1980	46,689	27,185	6,561	80,435	10,950
June, 1980	44,468	28,276	7,029	79,773	15,665
Sept., 1980	40,072	24,791	7,326	72,189	16,167
Dec., 1980	38,115	25,125	7,470	70,710	12,070
Mar., 1981	38,442	29,998	8,534	76,974	14,780
June, 1981	40,644	32,523	8,472	81,639	19,509
Sept., 1981	40,275	33,260	7,707	81,242	18,773
Dec., 1981	38,445	34,850	6,695	79,986	12,704
Mar., 1982	40,660	34,406	6,418	81,484	15,259
June, 1982	36,879	37,846	6,319	81,044	18,473
Sept., 1982	31,812	36,515	6,287	74,614	18,233
Dec., 1982	29,743	36,357	5,421	71,539	13,717
Mar., 1983	29,051	35,463	5,519	70,033	13,335
June, 1983	28,028	33,677	5,100	66,805	15,671
Sept., 1983	26,957	33,279	4,635	64,871	14,854
Dec., 1983	29,729	32,092	4,219	66,040	12,888

*From March, 1980 through December, 1981, 90-99 HP inventories were combined with the over-100-HP group.

Source: Farm & Industrial Equipment Institute, Retail Sales Reports, 1978-83.



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Write In (7) on Reply Card

Inventory Review *(continued)*

means to the end of losing excess weight. And so, since we're talking about symbols, we could look on those capsules as the equivalent of discounting—a means to the end of trimming surplus iron in this business, right?

If you read the back of the package, you find that the folks who make these capsules have some good advice:

"Do not use if you have high blood pressure, diabetes, heart, thyroid, kidney or other disease or are being treated for high blood pressure or depression or are under 18 or over 60....Do not take if you are presently taking another medication containing phenylpropanolamine, or any type of nasal decongestant drug..., etc."

There's more, but you get the idea: Some medicine carries with it the risk of side effects.

And there are people who will tell you that there are dangerous side effects that can result from excessive use of discounting as a means of trimming inventory.

One of them, frequently cited in these pages, is the pain that such practices inflict on the discounting manufacturer's dealer organization, particularly when almost all dealers have a fairly generous supply of used equipment on hand. Used equipment piles up as discounting progresses, while the per-unit value of the equipment goes down.

The discounting manufacturer, through his captive credit company, usually has to get involved in this used equipment, for the farmer and retailer usually have worked out a deal in which little or no cash is seen.

Thus, while the new machine is safely off the inventory log, there's another one, used, that's added. And to make a deal these days, discount notwithstanding, the dealer has to give a lot for the used machine.

And thus, our tables with this article give only a partial insight as to how the inventory struggle goes. If we were to get the full picture, we would have to have some impossible-to-get numbers: Number of new machines floored by and for the manufacturer, and their value, plus the number of used machines involved, along with the amount of flooring involved.

Two fast looks at Front-Wheel Assist:

1. Market share takes a big jump

While most of the tractor sales environment had the blahs in 1983, those units with power front axles really began to blossom. **By Scott Nesbitt**

■FRONT-WHEEL assist has apparently gone beyond the "passing fancy" stage, to become a major force in the tractor market.

The figures shown are an average of estimates made by several tractor manufacturers to I&T, all of whom had seen an "industry insider's" report on the FWA share of two-wheel-drive tractor sales. No formal public report is issued on the subject.

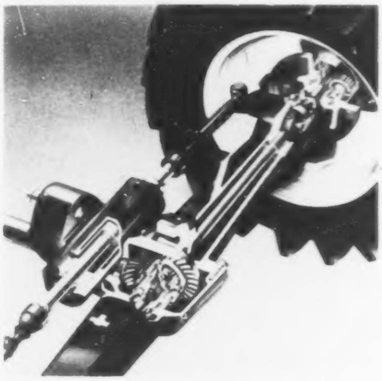
Market Share of FWA Tractors
(percent of sales)

	1978	1980	1983
Under 40 hp	30	38	47
40-99 hp	3.5	7.5	15
100-119 hp	1.5	2.1	9.5
120-139 hp	1.6	2.3	10.8
140 hp plus	1.1	2.3	25.5

Why the sudden surge in FWA sales when tractor sales in general were weak?

Gary Morten, sales support manager for White Farm Equipment, says the weather has a lot to do with it.

"You get a series of wet springs in a region, and the sales trend goes upward," Morten said. "Then once a farmer has front assist, he's very likely to keep buying that kind of tractor when it's time to trade."



Morten acknowledges that research studies on FWA find it's often hard to justify the FWA option from a strict cost-benefit standpoint, based on performance tests and fuel efficiency.

"Fear of loss is a big buying motivation," he commented. "A powered front axle is cheap insurance, especially if it could mean the difference between getting a crop in, or having to wait. A lot of the buying is spur-of-the-moment."

White Farm Equipment is the domestic pioneer of FWA, since the Oliver Corp., a White parent, introduced the 1800 and 1900 series in 1962 as the first factory-offered FWA tractors in the U.S.

In Europe and Japan, front-wheel assist tractors have held major market shares for a decade or more,

(Continued on page 45)

2. 'Keep your nose to the ground'

Here's what university and manufacturer engineers are saying about how strategic placement of ballast on FWA tractors can vitally affect the machine's performance.

■THIS COULD be the payoff question of the '80s:

How much extra performance does front-wheel assist give a tractor?

Your choice of answers:

1. **Up to** 19 per cent more.
2. **Makes** no difference.
3. **Actually** robs power.
4. **Can't answer** until performance is defined.
5. **All** of the above.

The correct answer is No. 5, if you believe the findings of various research reports and the experience of engineers who discussed FWA tractors recently with I&T.

Now the payoff: Here's a list of what engineers generally agree on—things that make a FWA tractor perform at its best. For a dealer running a field demonstration, these are points that might make the difference between a sale and a wasted afternoon:

Ballasting should put 40 to 45 per cent of the tractor's static weight on the front end.

Tire size should be carefully matched to achieve a nearly equal ground speed between front and rear end.

Radial tires will give a slight edge in traction.

Tire tread should match soil conditions, with good tall lugs in soft soil, somewhat worn lugs in firm soil.

Engage the front drive during all field pulling work. Don't try to hold it in reserve for tight spots.

Implement hookup should work toward a low drawbar height, not the high drawbar sought with 2WD tractors.

Working speed should be high; don't treat the tractor like a crawler.

Wheel spacing should be equal front and back, so the front lays a firm path for the rear to walk on.

Avoid duals on the rear; *they can actually cut traction.*

Inflation pressures slightly below normal may help a bit.

Remember, the FWA tractor is not a 2WD or 4WD but something

(More...)

Auctions

(Continued from page 4)

CASE TRACTORS

530, 1965 (Fair)	1500*
530, 1964 (Rough)	1700
800, 1957 (Fair)	775
730, 1967 (Fair)	2900*
730, 1964 (Fair)	4100*
730, 1965 (Fair)	2000*
730, 1967 (Rough)	1600
830, 1966 (Rough)	1300
870, 1975 (Fair)	4800
930, 1966 (Fair)	1625
1030, 1965 (Good)	4800
1030, 1966 (Good)	4000
1070, 1972 (Fair)	4700
1270, 1976 (Fair)	6750
1370, 1977 (Fair)	6000
1470 TK, 1971 (Rough)	4900*
2390, 1982 (Good)	20,000*
2470, (Fair)	10,750
2670 diesel, 19/2 (Rough)	11,000*
2670, 1975 (Good)	11,250*

COCKSHUTT TRACTORS

20, 1947 (Fair)	1175
1555 diesel, (Fair)	2400*

FORD TRACTORS

8N, 1948 (Rough)	1200
8N, 1950 (Fair)	1325
8N, 1952 (Rough)	1225*
9N, 1942 (Fair)	1100*
9N, 1945 (Fair)	1250
9N, Idr., 1942 (Fair)	1700
9N, 1942 (Fair)	935
NAA, 1954 (Fair)	1825
800, 1956 (Fair)	2625
3000, 1975 (Good)	4300
5000, 1973 (Fair)	5900
6000, 1960 (Rough)	1700
7000, 1974 (Fair)	6100*
8000, 1971 (Fair)	5500*
8000 diesel, 1973 (Fair)	5250
9600, 1975 (Fair)	5800
5610, (New)	12,900
4610, (New)	10,500*
860, Idr., (Fair)	2500
Sup. Maj., 1958 (Rough)	1625
Dexta, 1959 (Fair)	1425
960, 1957 (Fair)	1600
871, Idr., (Rough)	1300
850, Idr., (Good)	2600
Jub., 1953 (Fair)	1475
Jub., 1954 (Good)	2850
Jub., 1953 (Rough)	1300
Jub., 1952 (Fair)	2450
8700 diesel, 1977 (Good)	12,250*

ALLIS-CHALMERS TRACTORS

WD-45, 1952 (Rough)	500
WD-45, 1951 (Rough)	850
D-17, 1961 (Rough)	1550*
D-19, 1961 (Fair)	2050
D-21, 1967 (Fair)	4200*
190XT, 1970 (Fair)	4650*
190XT, 1970 (Good)	4900
190XT, 1970 (Fair)	3500
200, 1972 (Fair)	5500
200, 1973 (Good)	7200
200, 1971 (Fair)	4050*
200, 1972 (Good)	5650
200 diesel, 1972 (Good)	5650
210, 1971 (Good)	6100*
5040,	4100
7030, 1975 (Fair)	6150
7050, 1977 (Fair)	7500

FERGUSON & MASSEY-FERGUSON TRACTORS

TO-35, 1963 (Rough)	1700
35, 1960 (Fair)	1750
35, 1958 (Rough)	1425
50, Idr.,	1150
65 diesel, 1960 (Fair)	1700*
65, 1961 (Fair)	1775
85, 1959 (Rough)	1300*
85, 1962 (Rough)	2000
135, 1967 (Rough)	2325
165, 1968 (Fair)	3800
165 diesel, 1967 (Fair)	3825
175 diesel, (Good)	3950
245 diesel, 1981 (Fair)	5300*
1105 diesel, 1974 (Fair)	5300
1130 diesel,	1900
1800, 1974 (Rough)	5750*
2675, 1980 (Good)	14,100

DAVID BROWN TRACTORS

880, 1970 (Fair)	2600
1200, 1971 (Rough)	1850
1200, 1970 (Fair)	2575
990, 1962 (Fair)	1450
990, 1967 (Fair)	1950*

JOHN DEERE TRACTORS

A, 1952 (Fair)	475
A,	350
G, 1951 (Fair)	825
40, 1955 (Rough)	750
60, 1956 (Rough)	1075
60, 1953 (Good)	1850
70 diesel, 1953 (Good)	1075*
70, 1954 (Fair)	900*
70, 1953 (Rough)	700*
70, 1953 (Good)	1075*
50,	1050
M, 1948 (Rough)	750
620, 1957 (Rough)	1025
630, 1958 (Fair)	2150
720, 1957 (Fair)	1500*
720, 1957 (Rough)	1200*
720 diesel, 1957 (Fair)	1750
730, 1957 (Fair)	1500
730 diesel, 1959 (Fair)	1900
7300, 1957 (Rough)	1500
730, 1957 (Good)	2900*
950, 1978 (Excellent)	6000
1010, 1962 (Rough)	1800*
1010, 1962 (Rough)	1900*
1002, 1970 (Rough)	2875
2010, 1963 (Good)	3050
2010, 1962 (Fair)	2650*
2020, 1968 (Rough)	2725
2020, 1970 (Fair)	2200*
2030 diesel, (Fair)	2900*
2030, 1975 (Fair)	6300*
2510, 1966 (Good)	4000*
2840, 1979 (Good)	6700*
2840, 1979 (Fair)	8750*
3020, 1965 (Fair)	4000
3020, 1968 (Good)	5150
3020, 1968 (Good)	4200
4010 diesel, 1961 (Rough)	3775
4010, 1965 (Good)	4900
4010, 1963 (Fair)	3900*
4010 diesel, 1963 (Fair)	5000
4010 diesel, 1962 (Fair)	4150
4020, 1968 (Good)	7400
4020, 1964 (Good)	5600*
4020, 1966 (Fair)	2800*
4020, 1968 (Fair)	4500
4020, 1965 (Rough)	5000*
4020 diesel, 1967 (Fair)	5900*
4020 diesel, 1966 (Fair)	5200
4020, 1966 (Good)	6050*
4020, 1967 (Good)	6050
4020 1965 (Fair)	4200
4020 diesel, 1965 (Good)	6000*
4020, 1965 (Fair)	4150
4020, 1965 (Fair)	6800
4020, 1966 (Fair)	6050
4020, 1966 (Fair)	5250*
4020, 1970 (Fair)	7600*
4020, 1965 (Fair)	5800*
4230, 1976 (Good)	10,900
4230, 1975 (Good)	12,000*
4230 diesel, 1977 (Fair)	13,900*
4230 diesel, 1975 (Good)	11,900
4430, 1977 (Fair)	15,600
4430 diesel, 1975 (Fair)	12,900
4430 diesel, 1977 (Fair)	9500*
4430 diesel, 1976 (Fair)	10,000

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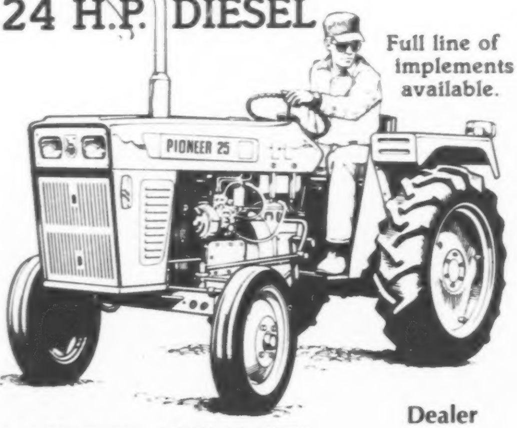

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4440, 1978 (Good)	19,900*
4440, 1979 (Good)	19,300
4440 diesel, 1979 (Excellent)	22,000*
4520,	8350
4630, 1974 (Fair)	11,800
4630, 1974 (Fair)	8300*
5020, 1970 (Fair)	5700
6030, 1975 (Fair)	11,000
8630 diesel, 1975 (Good)	18,650*
2130, 1974 (Fair)	6400

OLIVER TRACTORS

60, 1950 (Rough)	260
88 diesel, 1950 (Fair)	800
88,	475
88, 1950 (Rough)	375
88 diesel, 1952 (Rough)	550
1600, 1963 (Fair)	2100
1650, 1965 (Fair)	2600
1650, 1965 (Rough)	2100
1650, 1967 (Fair)	3300
1800, 1962 (Fair)	1900*
1850 diesel, 1965 (Fair)	4000
1850 diesel, 1966 (Fair)	4825
1855, 1973 (Good)	6250
1855, 1971 (Good)	4950*
1950 diesel, 1964 (Rough)	2600
2150,	5050

MINNEAPOLIS-MOLINE TRACTORS

M-5, 1965 (Fair)	900
M-602, 1963 (Fair)	2050*
M-620, 1965 (Fair)	1950*
G-705, 1966 (Rough)	1400

MASSEY-HARRIS TRACTORS

30, 1941 (Rough)	275
44, 1949 (Fair)	700
44,	160

STEIGER TRACTOR

Bearcat, 1971 (Fair)	11,000*

WHITE TRACTORS

2-150, 1977 (Rough)	9000
4-180 diesel, 1975 (Good)	10,800
2-45, (Good)	9600*

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190 diesel, 1970 (Fair)	3400
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G, mo., 1950 (Fair)	725

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2870 diesel, 1978 (Excellent)	2300*
2090 diesel, (Good)	10,000*
1570 diesel, 1976 (Good)	8900
1370 diesel, 1974 (Good)	5000
970 diesel, 1975 (Good)	6700

DEUTZ TRACTOR

6806 diesel, (Good)	3900

DAVID BROWN TRACTORS

1200 diesel, 1967 (Fair)	1650
770 diesel, 1965 (Rough)	675

MASSEY-FERGUSON TRACTORS

2705 diesel, 1979 (Good)	12,000
1155 diesel, 1974 (Fair)	3500
1130 diesel, 1968 (Good)	4125
1085 diesel, 1973 (Good)	4100*
1085 diesel, 1973 (Excellent)	5400
590 diesel, 1979 (Excellent)	5700*
590 diesel, 1979 (Excellent)	5850
275 diesel, 1976 (Good)	6000
275 diesel, 1975 (Good)	5200
265 diesel, 1977 (Good)	6200
235 diesel, 1976 (Excellent)	5150
175 diesel, 1973 (Fair)	2500
175 diesel, 1971 (Fair)	2400
165 diesel, 1972 (Fair)	3400
165 diesel, 1972 (Good)	3800
165 diesel, 1968 (Good)	3200*
165 diesel, 1966 (Fair)	2400*
135 diesel, 1970 (Good)	3550
135 diesel, 1970 (Good)	3550
135 diesel, 1966 (Good)	3300
135 diesel, 1966 (Rough)	1400
65 diesel, 1964 (Rough)	1000
65 diesel, 1963 (Rough)	1100*
40, 1956 (Good)	1225
35, 1956 (Fair)	1125
TO30, 1952 (Fair)	1075
TO30, 1952 (Good)	375

FORD-FERGUSON TRACTOR

9N, 1946 (Good)	1250

FORD TRACTORS

7000 diesel, 1975 (Good)	4850*
5000 diesel, 1971 (Good)	4400
5000 diesel, 1970 (Fair)	4150
5000 diesel, 1969 (Good)	3700
5000 diesel, 1969 (Fair)	3500
5000 diesel, 1968 (Fair)	3400
5000 diesel, 1968 (Rough)	2700*
5000 diesel, 1968 (Rough)	2550*
5000 diesel, 1968 (Fair)	3500*
5000 diesel, 1968 (Fair)	2925
5000 diesel, 1968 (Rough)	1525*
5000 diesel, 1968 (Fair)	3300
4600 diesel, 1976 (Excellent)	5000
4600 diesel, 1976 (Excellent)	5700
4000 diesel, 1974 (Excellent)	4900*
4000 diesel, 1972 (Good)	4100
4000 diesel, 1968 (Fair)	2700
3000 diesel, 1970 (Excellent)	3850
3000, 1969 (Excellent)	4175
3000 diesel, 1968 (Good)	3600
3000 diesel, 1966 (Good)	3200
3000, 1966 (Rough)	2250
3000 diesel, 1966 (Rough)	2300
3000 diesel, 1966 (Fair)	3000*
3000 diesel, 1966 (Fair)	3300*
3000 diesel, 1966 (Rough)	1600
2000, 1966 (Good)	2600
2000, 1966 (Good)	2725*
641, ldr., 1959 (Rough)	1300*
NAA, 1954 (Excellent)	2700
Jub., 1953 (Good)	1800*
8N, 1952 (Excellent)	1800
8N, 1952 (Excellent)	1975
8N, 1952 (Excellent)	1875
8N, 1952 (Good)	1600
8N, 1952 (Excellent)	2000

INTERNATIONAL HARVESTER TRACTORS

1568 diesel, duals, 1975 (Fair)	4100*
1086 diesel, 1977 (Good)	10,250
966 diesel, cab, 1975 (Good)	10,100
784 diesel, 1979 (Fair)	5700*
784 diesel, 1979 (Good)	7000
100 diesel, hydro, 1974 (Good)	5300
2300, (Good)	1750
684 diesel, 1978 (Good)	4900
666 diesel, 1973 (Fair)	2200*
574 diesel, 1973 (Good)	4350
574 diesel, 1972 (Fair)	3725
504 diesel, 1966 (Good)	3200
454 diesel, 1971 (Good)	3650*
404, 1964 (Rough)	385
300, 1955 (Fair)	600*
424, 1965 (Good)	1700
Cub, 1952 (Good)	1400
230, ldr., 1957 (Fair)	725
Cub, cult., plt., 1951 (Good)	1550
Sup. A, 1950 (Rough)	650
Sup. A, cult., 1954 (Good)	1750
B, mo., 1943 (Fair)	300

JOHN DEERE TRACTORS

4440 diesel, cab, 1979 (Excellent)	22,000*
4430 diesel, cab, 1977 (Excellent)	14,000

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Auctions *(continued)*

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4230 diesel, 1977 (Fair)	8500
4020 diesel, 1968 (Fair)	3400
4020 diesel, 1968 (Good)	4700
4000 diesel, 1970 (Good)	4000
3020 diesel, 1967 (Rough)	3000
2840 diesel, 1978 (Excellent)	7900*
2640 diesel, 1978 (Excellent)	7250*
2630 diesel, 1974 (Good)	4700
2630 diesel, 1974 (Good)	4600
2630 diesel, 1974 (Fair)	2875*
2440 diesel, 1977 (Excellent)	7800
2130 diesel, (Good)	4950
2130 diesel, (Fair)	4100
2130 diesel, (Fair)	3550
1020, 1967 (Good)	3300*
1530 diesel, 1975 (Excellent)	4750
2010, 1963 (Excellent)	2500
430, 1959 (Good)	1100*
430, 1959 (Fair)	700
720 diesel, 1957 (Good)	950
M, cult., plow, 1948 (Fair)	675

LONG TRACTORS

360 diesel, (Fair)	2000
360 diesel, (Excellent)	3800

SATOH TRACTOR

Stallion, (Excellent)	4100

KUBOTA TRACTOR

L175 diesel, (Good)	3000

NOTES:
Prices reported are for individual sales at wholesale on an "as is," "cash and carry" basis. Prices reported are **not** averages.

Condition Classifications:
EXCELLENT: Engine in perfect condition, 400 to 600 hours of use. Rubber – 80% tread remaining, no breaks or cracks. Paint – original and bright. General appearance: excellent.

GOOD: Engine in good running condition. Rubber – 70% tread remaining, no breaks or cracks. Paint – original or a good repaint job. General appearance: good over-all.

FAIR: Engine possibly in need of a minor overhaul. Rubber – 60% tread remaining, some cracking evident in sidewalls. Paint – only fair, weathered and some rust apparent. General appearance: worn, some dents, minor parts (gage covers, etc.) missing or broken.

ROUGH: Engine obviously in need of a major overhaul. Rubber – smooth. Paint – scarred, weathered, rusty. General appearance: dents, ruptures, broken parts, loose wires, components (such as lights) broken, missing or inoperative.

Vegetable Oils *(Continued from page 35)*

Also, engine makers are reluctant to redesign engines for better operation with alternate fuels not now economical to use, and which may not become cost-effective for years. But some researchers insist that modifications must be made for alternate fuels to be developed and accepted, rather than modifying fuels to match current engines.

Changes being made to accommodate what some call the deteriorating quality of current diesel fuels may also improve engine performance when used with vegetable oil fuels.

Varying assumptions

Readers who examine research reports should do so carefully, particularly when comparing results to other studies. For instance, some reports at the Fargo conference included cost of new buildings in comparing on- and off-farm vegetable oil production. Other studies assumed that buildings were available on farms or that commercial production would be done in existing plants.

Some studies included an allowance for dollar and energy values of oilseed meal after oil extraction. Others ignored meal value completely. In some reports, projections were made on the basis of escalating diesel fuel prices and stable prices for vegetable oils, apparently ignoring the fact that crop output costs go up in relation to energy costs.

Increasing output

According to Lipinsky, et al, Battelle Columbus (Ohio) Laboratories, "It is technically feasible to manufacture oilseeds on a sufficient scale to permit manufacture of an additional 1-1.5 billion gallons, over and above domestic vegetable oil requirements and traditional export requirements." Most of this increased production would be expected to come from production of new crops and conversion of land from pasture and other uses. Such conversion would require a long time period, and as has been pointed out by other studies, it could result in severely increased erosion from marginal grazing land pushed into crop production.

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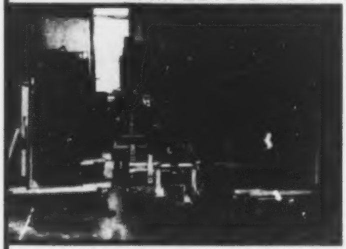

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Front-Assist Sales

(Continued from page 16)

a fact reflected in their sales in the U.S.

Deutz, from West Germany, gets about half its North American sales from FWA tractors, said Frank Kaplan, vice-president of marketing. Deutz limits its imports to the range of 50 to 150 pto hp, and to 30 Eastern U.S. states and three Western Canadian provinces.

"The biggest demand for front-assist is areas off the plains, in the moister areas of the country," Kaplan said. "Our marketing area overlaps the demand area, except that we don't get into California, where front-assist is strong."

Kubota, one of the earliest and largest Japanese importers, sells "considerably over 50 per cent" FWA tractors, according to Mike Fairless, a sales engineer. Kubota's strength is in the 40-and-under hp range, though it recently moved its line upward to 76 pto hp.

"We were in the FWA market early, and it's interesting that the FWA share of our sales has held relatively constant in the last three years," Fairless said. "I suspect that as other companies offer more FWA tractors, they will also get well above the 50 per cent mark before they also level off."

Stealing 4WD sales

Some interesting random comments about the FWA market from people who know something but didn't want their names used:

- **"The big front-assist** tractor is eating into the bottom end of the four-wheel drive market. The farmer can get something he's familiar with, that'll fit in his machine shed, that has a pto, that doesn't need a bunch of new implements."
- **"In a few years,** close to 50 per cent of all two-wheel drive tractors over 60 hp will be sold with front assist."
- **"Now that** everybody has it, look for a wave of technical innovation, detail refinements on the front end. The engineers are gonna have some fun for the next few years."
- **"You'll probably** see a lot more front assists that can't be disengaged. If you can send extra torque to the front end, you can boost engine horsepower without beefing up the rear end. A 70 hp rear end can handle a 100 hp engine, if the extra 30 goes to the front. We could have a new horsepower race."
- **"A few years ago,** the big domestic manufacturers gave a polite yawn when you mentioned front assist. That was something the Europeans did. It looks like the farmers were ahead of the game again. But if it's such a good idea, why didn't it catch on until now?" I&T

More to Come

In the June I&T, watch for a report on how tires affect FWA performance, and what to do about it.

Research Credits

The following papers from the American Society of Agricultural Engineers discuss FWA tractors:

ASAE Paper 83-1560, *"Performance of a Front Wheel Assist Tractor,"* by Gary R. Woerman and Leonard L. Bashford, U. of Nebraska, Lincoln.

ASAE Paper 83-1563, *"In-Field Fuel Efficiency Comparisons of Various John Deere Tractors,"* by Ronald L. Jurek and Bruce C. Newendorp, Deere & Co., Waterloo, Iowa.

ASAE Paper 63-601, *"Design and Performance Characteristics of Oliver Four-Wheel Drive Tractors,"* by H.K. Dommel and K.W. Race, Oliver Corp., Charles City, Iowa.

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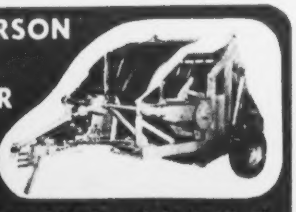

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The business magazine of the farm & industrial equipment industry

June 1984

TWO DOLLARS

Implement & Tractor

Dealer Attrition

How many have fallen? How will the rest survive? page 10

Dealer Replacement

The challenge is there – and the new dealers look ready to meet it!
page 12

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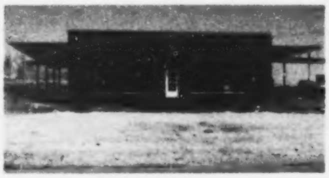

page 10

page 12

On the cover... When the Deere dealership at Olathe, Kan., was closed, the new dealer, Dave Webb, moved to a location on the edge of town, occupying two houses that had been remodeled by the former tenant, a construction firm. Webb, who has farmed near Olathe for many years, also has banking experience and is a third-term member of the Kansas State Legislature.

10: Dealer Attrition. A survey by FEMA provides a rough count, corrected in part by some suppliers. How will the remaining dealers fare: More fold-ups? Watch for a changed marketing environment.

12: Dealer Replacement. It's not easy to find new people and capital to take over where dealerships close up. But it's being done.

16: Making Tracks with FWA Tractors. Dealers get peak performance out of front-wheel-assist tractors by taking advantage of the track-laying action of the machine's driven front wheels.

22: If You Must Swap Tires... Some notes on the math involved in making tire changes on FWA tractors.

24: FIEI Sales Forecast is Downscaled. Sales for 1984 are up, but not as much as was expected by forecasts issued last January.

26: The One-for-All Computer System. A look at the nation-wide computer network being used by Canadian Ford tractor and auto dealers.

40: The View from Paris. The big ag equipment show in Paris features eye-catching hardware and some ear-grabbing talk about mergers.

42: Shortliners in Spring. FEMA members meet in San Diego to take one another's pulse, get insights on planning, avoiding burnout, and moving out of that Type A neighborhood.

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I&T Update

Tractor Sales Showed Strength In April; Other Products Soft

Retail sales of farm tractors showed a unit increase of almost 15 per cent in April, according to the Farm & Industrial Equipment Institute's flash report. The only horsepower group that shows weakness is the 100-139 bracket. Sales of combines continued their downward trend while balers, forage harvesters and mower-conditioners held approximately even with April, 1983.

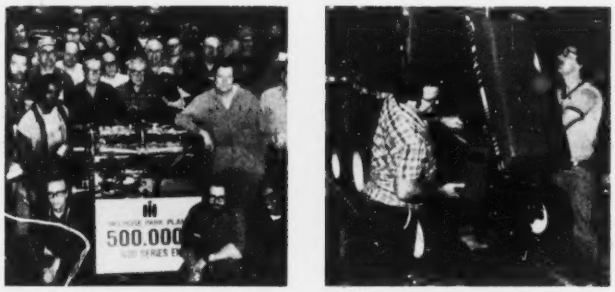
	Unit Retail Sales					
	April			January-April		
	1984	1983	Pct. Change	1984	1983	Pct. Change
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	6,186	5,192	+19.1	15,162	14,278	+ 6.2
40-99 hp	4,194	3,618	+15.9	13,690	11,876	+15.3
100-139 hp	1,464	1,667	−12.2	3,742	5,265	−28.9
Over 140 hp	1,765	1,387	+27.3	5,312	3,700	+43.6
Total 2-wheel drive	**13,609**	**11,864**	**+14.7**	**37,906**	**35,119**	**+ 7.9**
4-wheel drive						
Under 200 hp	206	204	+ 1.0	642	610	+ 5.2
Over 200 hp	270	189	+42.9	1,031	757	+36.2
Total 4-wheel drive	**476**	**393**	**+21.1**	**1,673**	**1,367**	**+22.4**
Total All Tractors	**14,085**	**12,257**	**+14.9**	**39,579**	**36,486**	**+ 8.5**
S-P Combines	457	539	−15.2	2,467	3,645	−32.3
Balers (under 200-lb. bales)	496	505	− 1.8	1,645	1,736	− 5.2
Forage Harvesters (shear-bar type)	153	151	+ 1.3	518	626	−17.3
Mower-Conditioners	819	822	− 0.4	2,710	2,601	+ 4.2

Hesston's Sales Up, Losses Down In 1st Quarter

Hesston Corp. had net sales in the first quarter of 1984 of $42.1 million, an increase from the $37.6 million posted in the same 1983 period. The net loss of $2.8 million was an improvement on the 1983 loss of $4.87 million.

At a stockholders' meeting, Howard Brenneman, president and chief executive officer, said Hesston's effort to acquire more "Prime Line" dealers (handling the whole Hesston line, including tractors) was ahead of schedule.

A Pair of Milestones



While International Harvester was noting the production of its 500,000th 400-series diesel engine at Melrose Park, Ill., there was some similar celebrating at John Deere's Horicon (Wis.) Works as the 1-millionth Deere lawn and garden tractor rolled off the line.

IH began building the 400 series at the plant in 1971. Deere started turning out garden tractors at Horicon in 1963, reaching the half-million mark in 1977.

1st Quarter: Ag Equipment Makes Export Rebound

Exports of U.S. farm equipment in the first quarter of 1984 took a 23 per cent jump in dollar volume to $520 million after 1983 saw a 16 per cent decline from the previous year.

The most significant gainers in the first period were Canada (up 41 per cent to $239 million), Australia (up 185 per cent to $38 million), United Kingdom (up 16 per cent to $21 million), Belgium (up 14 per cent to $15 million), Venezuela (up 23 per cent to $7 million) and Libya (up from nowhere to $14 million).

Total 1983 farm equipment exports were $2.014 billion.

Michaels Joins Case; 4 Others To Major Posts

At J I Case Co., Jack D. Michaels has been named executive vice-president, agricultural equipment. He had been with International Harvester Co. for 24 years and was most recently president of the IH Agricultural Equipment Group.

Also appointed to top level positions were James J. Gill, executive vice-president, technology; John A. Borden, executive vice-president, finance and corporate planning; Robert R. Riebau, senior vice-president and general manager, components; and Earl W. Bunkers, vice-president and controller.

All except Bunkers report to Jerome K. Green, president and chief executive officer. Bunkers reports to Borden.

IH Ag Group: Aal Is President, Elliott Senior VP

Irvin E. Aal, who joined International Harvester Co. in October 1983 as senior vice-president of the Agricultural Equipment Group, has been named president of the group. He is succeeded by George C. Elliott, formerly the company's staff vice-president for worldwide purchasing.

Aal, who had been with Sperry New Holland for 22 years before his move to IH, succeeds Jack D. Michaels, who resigned. When Aal left Sperry New Holland, he held the post of vice-president and general manager, North America.

Elliott, who joined IH in 1981, is responsible for product planning, marketing, sales, quality and reliability in his new post. From 1968 to 1981, he was with Deere & Co.

Jim Johnson Heads Marketing At Lilliston

James R. Johnson, who had been vice-president, sales and marketing, for Claas of America, has been named marketing vice-president for Lilliston Corp., Albany, Ga., according to James C. Mainwood, Lilliston president.

Johnson's career includes service as director of marketing services for White Farm Equipment Co. and 10 years in marketing assignments at Allis-Chalmers.

Editor's Notebook

(continued)

more intensely.

Do I have any advice for manufacturers? None beyond the obvious: Pay attention not only to those Class I-A farmers who buy new equipment; remember that your welfare is tied to smaller operators, too. Focus harder on parts operations, for you and your dealers will need more cash flow from that direction from here on out.

And finally, do I have any suggestions? No, but I do have a question. What about overseas marketing of used farm equipment? Think how happy it would make all of us to see ships disappear over the horizon, laden with used equipment and bound for exotic ports where dollar-rich natives eagerly awaited their arrival.

I know that the British equipment industry used to have some rather lucrative overseas markets for used tractors in places like Turkey and North Africa. Another nice market was the United States. Specialists in the U.K. and some savvy American dealers dealt in late-model Fords and Massey-Fergusons.

Most of that business is gone. The British machinery trade today finds itself checking regularly to see how things are going over in Ireland, where its biggest offshore used equipment market now lies. Hard times in Ireland cut into U.K. used equipment turnover.

It might be possible to establish markets for American used equipment overseas, providing there is an infrastructure to go with it. When the economies of Latin American nations, particularly Mexico, were stronger, buyers came to auctions and dealers in the southern U.S. to buy older units. But currency problems have made U.S. used equipment too expensive for many of them.

Another problem is that the world's major tractor manufacturers are already working those markets and are not anxious for an influx of used stuff from here.

So perhaps I've answered my question. There are no easy solutions to the used equipment problem. Indeed, the only answer is to know what individual machines are really worth in the marketplace.

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT CO.
Dothan, Alabama
April 10, 1984

ALLIS-CHALMERS TRACTORS

7060 diesel, 1975 (Fair)	4000*
7030 diesel, 1974 (Rough)	2950*
D14, cult., plow, plt., 1958 (Good)	1200

CASE TRACTORS

2470 diesel, cab, duals, 1978 (Good)	7100
1370 diesel, cab, duals, 1974 (Good)	5450

DEUTZ TRACTOR

9006 diesel, 1972 (Fair)	2825

DAVID BROWN TRACTOR

1412 diesel, 1975 (Good)	3900

MASSEY-FERGUSON TRACTORS

1130 diesel, 1968 (Rough)	2400
1100 diesel, 1966 (Rough)	2350
1085 diesel, 1975 (Excellent)	6100*
1085 diesel, 1975 (Good)	4800*
1080 diesel, 1972 (Fair)	3100
590 diesel, (Good)	4000*
275 diesel, (Good)	4375
265 diesel, 1978 (Fair)	4550
265 diesel, 1977 (Good)	5500*
230 diesel, 1976 (Excellent)	4600
180 diesel, 1967 (Fair)	2850
165 diesel, 1971 (Excellent)	4200
165 diesel, 1966 (Fair)	2550
165 diesel, 1966 (Good)	3250
135 diesel, 1974 (Excellent)	3875
135 diesel, 1972 (Excellent)	4350
135, 1968 (Good)	3550
135 diesel, 1968 (Good)	3550
135 diesel, burned, 1966 (Rough)	700
135 diesel, 1966 (Good)	3150
50, 1958 (Good)	2100
40, 1957 (Good)	1750
35 diesel, 1963 (Excellent)	2400
35 diesel, 1962 (Good)	2000
TO30, 1953 (Excellent)	1600*

FORD-FERGUSON TRACTOR

9N, 1947 (Excellent)	1600

FORD TRACTORS

7700 diesel, 1978 (Excellent)	9000*
6600 diesel, cab, 1976 (Good)	6100*
6000 diesel, 1963 (Fair)	775
5000 diesel, 1967 (Fair)	3150
5000 diesel, 1967 (Rough)	2850
5000 diesel, 1966 (Rough)	2700*
5000 diesel, 1966 (Good)	4200
4600 diesel, 1976 (Good)	5000*
4600 diesel, 1976 (Good)	4700
4400 diesel, 1966 (Fair)	2750*
4000 diesel, 1966 (Rough)	1850
4000 diesel, 1974 (Excellent)	4200
4000 diesel, 1972 (Good)	3700
4000 diesel, 1967 (Fair)	2850
3000 diesel, 1969 (Good)	3550
3000 diesel, 1968 (Good)	3100*
3000 diesel, 1968 (Good)	3150*
3000 diesel, 1968 (Good)	3250
3000 diesel, 1968 (Good)	3625
3000 diesel, 1967 (Good)	3400
2000 diesel, 1966 (Good)	2300*
2000 diesel, 1964 (Good)	1900*
Maj., 1953 (Fair)	575
Maj., 1953 (Fair)	550
95 diesel, 1957 (Good)	1250*
851 diesel, 1958 (Fair)	1450
861 diesel, 1958 (Good)	1500
860, 1957 (Good)	1750
841 diesel, ldr., 1958 (Good)	1900*
641, 1956 (Fair)	1400
541, 1958 (Good)	1500*
Dexta, 1959 (Good)	1400*
Jub., 1953 (Fair)	1200*
8N, 1952 (Excellent)	1850
8N, 1952 (Excellent)	1900
8N, 1948 (Good)	1425
8N, 1950 (Good)	1650
8N, 1948 (Fair)	1375
8N, 1951 (Good)	1750
8N, 1948 (Fair)	1400
8N, 1952 (Good)	1750

INTERNATIONAL HARVESTER TRACTORS

1468 diesel, 1972 (Fair)	3400*
1466 diesel, 1975 (Rough)	3300*
784 diesel, cab, 1980 (Excellent)	6450
784 diesel, 1980 (Excellent)	6315
684 diesel, cab, 1980 (Excellent)	6400*
674 diesel, 1979 (Good)	4050
454 diesel, 1971 (Good)	3475*
2400 diesel, burned, (Rough)	325*
B414, 1962 (Rough)	700
B275 diesel, 1959 (Rough)	500
300, 1955 (Rough)	450*
100 diesel, hydro, 1974 (Good)	4500*
Sup. C, cult., plt., plow, 1953 (Good)	800
Sup. C, 1953 (Rough)	400
Sup. A, cult, 1953 (Good)	1400*
Sup. A, cult, 1953 (Good)	1850
H, 1944 (Rough)	225*
140, cult., plt., plow, 1963 (Good)	2500
A, 1941 (Good)	525

JOHN DEERE TRACTORS

4440 diesel, cab, 1978 (Excellent)	18,800
4240 diesel, 1978 (Fair)	10,000*
4030 diesel, 1975 (Excellent)	9000*
4020 diesel, 1969 (Good)	5000
3020 diesel, 1965 (Good)	3950
3020 diesel, 1964 (Fair)	3400
3010 diesel, 1962 (Good)	2700
2940, 1981 (Excellent)	9700*
2840 diesel, 1978 (Excellent)	8100
2840 diesel, duals, 1978 (Good)	6400*
2840 diesel, 1978 (Good)	5750*
2640 diesel, 1978 (Good)	6500*
2630 diesel, ldr., 1974 (Excellent)	9000
2440 diesel, cab, 1977 (Good)	5500
2120 diesel, (Good)	3700
2030 diesel, 1973 (Excellent)	4200*
1020 diesel, 1967 (Excellent)	3700
1010, 1961 (Fair)	1500
430, 1959 (Good)	1250*

KUBOTA TRACTORS

L260 diesel, (Good)	2400
L245 diesel, 1978 (Excellent)	2550

SATOH TRACTOR

Bull (Good)	3000

LONG TRACTORS

560 diesel, (Rough)	500
460 diesel, (Good)	3500

WHITE TRACTORS

2-105 diesel, 1976 (Good)	6900

OLIVER TRACTOR

55 diesel, 1955 (Rough)	500

YODER & FREY, INC.
Archbold, Ohio
April 9, 1984

INTERNATIONAL HARVESTER TRACTORS

Sup, C, 1952 (Good)	1250
Cub, 1961 (Fair)	1300
A, 1945 (Fair)	1200*
A, 1955 (Fair)	2150*
C, 1950 (Fair)	900*
C, 1952 (Rough)	600*
C, 1952 (Fair)	1650*
154 Lo-boy, 1972 (Fair)	2250

(Continued on page 37)

Dealer Attrition

By Bill Fogarty

Survey by FEMA provides a rough count, corrected in part by some suppliers. How will the remaining dealers fare: More fold-ups? Watch for a changed marketing environment.

■WHAT'S the best gauge of farm equipment dealer retail attrition? The answer is easy: It's the semi-annual survey of state, regional and provisional dealer association managers taken by the Farm Equipment Manufacturers Assn.

And we have to say of that effort that it is flawed. We're not the only ones. Over at FEMA, Bob Schnell and the recently retired Harold Halter freely admit that some association managers don't always respond, and that they don't appear to keep records uniformly on such matters.

The manufacturers whose dealer body counts make up the survey also find fault with it – when we can get them to comment on it.

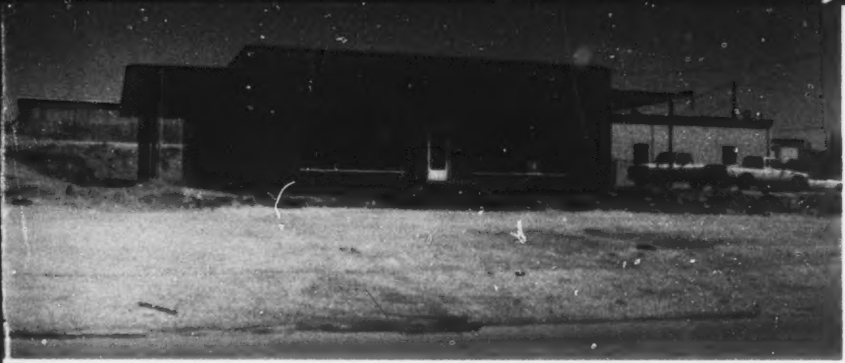
Granted, it has holes. But it's the

3 Years of DEALER ATTRITION in North America

(As reported from surveys of state, regional and provincial dealer association managers.)

Company	1981 1st six months	 2nd six months	1982 1st six months	 2nd six months	1983 1st six months	 2nd six months	Total 1981-1983
Allis-Chalmers	22	19	19	24	18	15	117
J I Case	17	10	17	10	13	12	79
John Deere*	14	13	14	12	18	21	92
Ford	37	22	24	24	15	16	138
International Harvester*	46	59	54	48	39	16	262
Massey-Ferguson	23	39	53	29	38	16	198
White Farm Equip.	13	17	12	14	14	15	85
Others	6	3	10	5	11	6	41
Shortline	10	19	23	12	14	11	89
Unidentified	20	16	23	7	8	9	83
Totals	**209**	**217**	**249**	**185**	**188**	**137**	**1,185**

SOURCE: Farm Equipment Manufacturers Assn.
*Different figures provided by manufacturer. See text.



only game in town. Nobody else is conducting such a continuing poll and regularly publishing its results.

One of the problems with it is that it doesn't tell us when a dealer has gone out in a six-month period and is replaced in the next six months. (Or maybe it does in some cases. I know at least one association manager who has a very exact method of responding to the survey in light of what he thinks is appropriate. There may be others.)

It also may not disclose a very typical situation: A dealer goes out. The company offers the franchise to a rival dealer nearby. It's accepted. Are we minus one or not? The company has the same contract count and the dealer association is minus one. Conversely, a dealer may expand by taking over a closed-out dealership a county or two away. There is one less company-dealer contract but the same number of association memberships.

With all that said, let's take a look at the table that FEMA has accumulated through three years. It indicates a total decline in dealer numbers from Jan. 1, 1981, to Dec. 31, 1983, of 1,185.

I&T sent copies of the FEMA table to marketing executives of the seven companies included in it and asked them to comment on its accuracy. What we hoped for, at best, was each company's number of North American dealers at the start of the three years, number of losses, number of replacements and number at the end of the period. Here's what we got:

- **J I Case** reported a net gain in dealerships and company-owned retail outlets in 1983.
- **International Harvester** had a net loss of agricultural dealers in the three fiscal years of 143. Earlier, International had told I&T that there was a net loss of 33 ag dealers in 1981 and that termination of 59 industrial dealers the same year may have produced some association member losses as well. IH also said that in the first half of 1982, there was a net ag dealer loss of 41, with 21 of these locations to be replaced. Also, another 38 industrial dealers were terminated in the same six-month period.
- **Deere & Co.** had 2,297 dealers in North America in January, 1981, and 2,180 three years later, a reduction of 117.

At deadline, there was no response from any of the other listed companies.

How many left?

In September, 1982, I&T estimated that there were 10,000 dealerships in North America that were members of dealer associations. This was based in part on a list of current members of United States dealer associations reported to the National Farm & Power Equipment Dealers Assn. as well as several estimates of Canadian dealer population. If we estimate attrition since then at about 500, we're looking at 9,500 farm equipment dealers currently active in North America. At least, there are that many who consider themselves dealers to the point of belonging to a dealer association.

Will more dealers fall out along the same patterns shown over the past three years? In I&T's view, more dropouts are yet to come, but not at the rate we've been witnessing. Here are our reasons:

- There is still far too much inventory of major pieces of new equipment. Even in good economic conditions, dealers have tended to give away too much of their margins and hoped to make it up on volume. But the volume isn't there in most markets, and this will cost us some dealers.
- Not enough dealers have retained a fair share of their potential parts market. Mass merchandisers have taken over a substantial slice of the fast moving side of this basically lucrative segment of the business. Result: Reduced cash flow from parts sales will take down some more dealers.
- And failure to capture service business, at a profit, as farmers are making do another season with present equipment, will be the last straw for others.

Now these are reasons why dealers go out of business in far better times. It's just that there's less room for error today. In addition, there are always dealers who close up just because the time has come to call it quits, and hanging it up becomes more appealing to some in tough times.

Dealers are better

On the other hand, there are reasons why we won't see as many fold-ups as we have in recent years. These reasons are aside from whatever improvements we might expect in the market outlook.

- First, what this industry has gone through in the last few years has produced a new breed of hardier, more management-oriented dealer. He is less inclined to let used equipment pile up. He's more decisive about accounts receivable. He avoids inventory load-ups.
- Further, he has started to regain his awareness of the soul of this business—parts and service. The edge that these two departments give him is becoming clearer and he's giving them the attention they deserve.
- Moreover, some dealers are recognizing that not all retail farm equipment businesses can make it selling only field equipment. They are spreading their wings a bit and will probably survive by taking on a variety of farm- or rural-related products—and thereby give the major companies a wider exposure than they would have otherwise.
- And some other dealers are recognizing that they don't have to limit themselves to farmers or contractors as customers.

Considering how severe the blows have been in the 'eighties, par-

(Continued on page 14)

Replacement *(continued)*

mostly we're seeing inactive owners putting up the money and hiring experienced managers with good track records. And dealerships are being bought right!"

7. "The replacements have been surprisingly good, both in terms of management skill and capitalization."

8. "I don't have any feeling either way, except to say that one company is making it too easy to get in; they require almost no up-front money, and they're losing dealers at a high rate. Meanwhile, I'm seeing some dealers taking on truck and auto franchises."

9. "Those I've met are impressive. They aren't sitting back and waiting for business to improve—they're going after some business that was being neglected. They're very aggressive.

"As for dealers going out of business, I'm afraid we haven't seen the last of it. I'm worried about 1985 and 1986."

Summing up

That word "aggressive" may be the tipoff, the answer to the question about how to persuade somebody to get into this business. There is a breed of businessman who understands the potential opportunity that exists in a troubled industry—perhaps partly because it *is* troubled.

Specifically, he perceives that he can get into the business at a rather attractive price. Second, he may sense that some of the veteran participants in the market have lost some of their zest for the game as times have gotten tough, and that he can take sales away from them. Third, he may feel confident that his skills as a businessman will be good enough to see him through the rest of the bad times and leave him poised to take maximum advantage of good times.

Early in this article, I cited a rather dismal statistic about average net profit to net worth. I must admit I let that figure impress me. But when I heard the dealer development specialists speak so optimistically and the association managers speak so approvingly of the new entrants, I went back and checked the NFPEDA Cost of Doing Business study again.

This time, I examined only what the high-profit dealers were doing. The high-profit dealers are those whose net income was in the top 25 per cent of reporting dealerships. There are four divisions of agricultural equipment dealer in the study according to volume—under $1 million, $1-2 million, $2-3 million and over $3 million. Here's their net profit as a percentage of net worth:

Under $1 million—**20.1**
$1-2 million—**19.4**
$2-3 million—**21.3**
Over $3 million—**29.1**

All of them are a far cry from the 5.3 per cent notched by the average dealer. True, a high-risk business should be able to produce better results than these, given sound management and reasonable market conditions. But market conditions haven't been reasonable. When they get better, you can expect to see those high-profit dealers—the new ones and the veterans—coming in with much better numbers.

Congratulations, then, to the industry marketers who have been recruiting dealer replacements on a quality level. I believe it because of the witness of those association managers. (And to any marketers who put in dealers who shouldn't be there because they lack the skills or the finances, my condolences, because you'll have to do the job over again before long, and it will be even tougher.) I&T

Dealer Attrition *(Continued from page 11)*

ticularly in comparison to the soaring expectations—and overinvestment—of the 'seventies, it appears that dealers as a whole haven't done too badly. True, there has been a lot of erosion of net worth, but a lot of that existed only on paper, and surviving dealers are generally much healthier than most surviving companies.

Things will change

Watch dealers in the next few years. More of them will find new ways of surviving that haven't generally been considered before. Remember, there is still a huge agriculture throughout North America that has definite needs with regard to all facets of power application.

It's also an agriculture whose practitioners have need for reasonably convenient services. Some dealers will find ways of staying physically close to those farmers, selling other, non-related products along with equipment to justify their presence. And they may sell to others besides farmers.

There was a time when the farm equipment industry needed over 30,000 dealers in North America. That post-war mechanization job was finished many years ago, and the need has been declining ever since for the *kind* of dealer who could operate in terms of 1950s expectations, but could do little more.

We've all heard most of the requirements or expectations that dealers must meet in the '80s and '90s—high-quality personnel, efficient facilities, refined parts inventories, financial strength, etc. I'd like to add to all that.

Dealers who want to survive through the rest of the century will have to achieve a new flexibility. Specifically, they will have to sense, even anticipate, the ever-changing needs of their customers, and each farmer's needs will be increasingly different from other farmers, even neighbors. And then the dealer will have to go out and find the best response to that farmer's need. I doubt that it will be as easy as before, when many dealers could count on one or at most two major manufacturers, plus a few distributors and shortline firms, to come up with everything their farmers wanted.

Rather, as farmers get more specific in their demands for new approaches to their very individualized farming objectives, dealers will have to be very creative in finding the equipment that gets the job done.

The challenge is there and the need is there. Best of luck to everybody who wants to give it a try. I&T

U.S. SALES FORECAST UPDATE, 1984, 1985

(Unit Retail Sales)

Product	Actual Sales 1983	Sales in 1984 as seen in Jan. 1984	Sales in 1984 as seen in May 1984	Sales in 1985 as seen in Jan. 1984	Sales in 1985 as seen in May 1984
Farm Tractors:					
Under 40 hp	45,601	46,300	46,750	47,600	48,250
40-99 hp	38,083	41,300	41,000	44,200	44,000
100 hp and over	28,154	31,500	31,000	33,250	33,000
Four-wheel drive	5,099	6,100	6,000	6,500	6,400
Total Farm Tractors	**116,937**	**125,200**	**124,750**	**151,550**	**121,650**
S-P Combines	12,751	17,250	16,000	19,250	16,800
Corn Heads	6,830	9,950	8,650	11,850	10,000
Forage Harvesters (1)	4,091	4,300	4,100	4,550	4,300
Balers, Square (2)	9,037	8,725	8,700	8,750	8,500
Balers, Round (3)	12,200E	13,500	12,800	14,600	13,825
Windrowers	2,593	3,450	3,315	3,550	3,450
Mower-Conditioners	14,261	14,500	14,825	15,200	15,200
Grinder-Mixers	4,018	4,550	4,300	4,800	4,600

E—I&T estimates. (1) Shear-bar type. (2) Bales under 200 lbs. (3) Bales over 200 lbs.
Source: Farm & Industrial Equipment Institute

FIEI Sales Forecast Is Downscaled

By Bill Fogarty

■INDUSTRY EXECUTIVES, having participated in a December survey on the 1984-85 sales outlook (see I&T, Feb.), took another look at their prospects for the same two years in a poll taken in March.

Their outlook, as reported at the Marketing & Management Conference of the Farm & Industrial Equipment Institute in May, is for improvement over 1983, but not as much as had been anticipated several months earlier.

For instance, in terms of overall retail dollar volume, the group's expectation for 1984 went from a 10 per cent improvement down to an 8 per cent gain.

Tractor unit sales expectations similarly were off slightly—from 125,200 units to 124,750—but still an improvement on the 116,937 tractors sold in 1983. In the first four months of 1984, actual retail sales totaled 39,579 units, an 8.5 per cent gain from the same 1983 period.

The combine retail sales forecast appeared to puzzle many participants in the conference. The outlook last December was for a strong 23 per cent improvement from the 12,751 units sold in 1983. The updated forecast was even stronger—a 25 per cent rise to 16,000 units. But by the end of April, combine sales of 2,467 units were down 32 per cent from the same four months of 1983.

The update forecast on combines was made by eight participating companies. One of these expected a modest improvement of 9 per cent; three others saw it at from 16 to 21 per cent; four others predicted an increase of 28 to 32 per cent. The 25 per cent figure is a median.

Later, some participants in the survey noted that a lot can happen between the time the survey form is issued in March and the report is given in mid-May. Several suggested that the survey be taken, collated and delivered over the two-day span of the conference as an approach to making the report more valuable.

John W. Snead (Sperry New Holland) served as reporter of the State of the Industry forecast to the conference participants.

The Marketing & Management Conference of the Farm & Industrial Equipment Institute was held May 16-18 at Oconomowoc and West Bend, Wis. Gehl Co., based in West Bend and celebrating its 125th anniversary, acted as host company. Next conference is scheduled for Jan. 27-29, 1985, at Frenchman's Reef, St. Thomas, Virgin Islands.

1984-85 Forecasts on Other Products: Spreaders, Tillage, Agri-Equipment

(Per cent change from previous year, unit volume)

	Jan. forecast		May forecast	
	1984	1985	1984	1985
Manure Spreaders	+ 4.0	+ 5.0	+ 1.5	+ 2.0
Moldboard Plows	+ 5.0	0	+ 5.0	0
Disk Harrows	+ 10.0	+ 5.0	+ 8.0	+ 5.0
Field Cultivators	+ 9.0	+ 8.0	+ 8.7	+ 7.5
Chisel Plows	+ 10.0	+ 5.3	+ 9.0	+ 5.3
Portable Augers, Elevators	+ 8.0	+ 5.0	+ 5.0	+ 5.0
In-Bin Dryers	+ 5.0	+ 6.0	+ 5.0	+ 5.0
Batch, Continuous-Flow Dryers	+ 15.0	+ 10.0	+ 15.0	+ 10.0
Grain Bins	+ 5.0	+ 10.0	+ 1.5	+ 8.0
Milking Machines	+ 2.5	+ 5.0	0	0
Dairy/Beef Equipment	+ 5.0	+ 5.0	0	0
Hog Equipment	+ 4.0	+ 8.0	+ 3.0	+ 4.0
Lawn/Garden Equipment	+ 8.0		+ 10.0	

Source: Farm & Industrial Equipment Institute

Auctions

(Continued from page 4)

184, 1977 (Fair)	2550*
H, 1948 (Rough)	410
H, 1945 (Rough)	425*
H, 1948 (Rough)	435*
H, 1951 (Fair)	825
H, 1950 (Fair)	850
H, 1950 (Fair)	700*
H, 1945 (Rough)	475
H, 1950 (Rough)	250
H, 1948 (Fair)	525
H, 1950 (Good)	650
SH, 1951 (Rough)	600
M, 1951 (Fair)	750*
M, 1948 (Fair)	1050*
W6, 1957 (Fair)	700
W6	285
140, 1972 (Fair)	2625
240, 1961 (Rough)	700*
300, 1955 (Fair)	880
300, 1955 (Rough)	1650*
300, 1955 (Rough)	1950
300, 1956 (Fair)	1500
400,	320
400, 1954 (Good)	1000
450 diesel, 1958 (Fair)	925
450, 1957 (Rough)	800*
450, 1958 (Rough)	700
450, 1957 (Fair)	1275*
450, 1957 (Rough)	575
450, 1957 (Good)	1100*
450, 1957 (Fair)	1100*
460, 1961 (Rough)	1000*
460, 1961 (Rough)	1000*
460, 1959 (Rough)	1100*
460, 1958 (Rough)	1500*
560, 1961 (Fair)	1500
560, 1961 (Fair)	2000*
560, 1960 (Rough)	1550
560, 1959 (Good)	2200
560, 1960 (Rough)	1600*
584, ldr., 1980 (Excellent)	11,500
656, 1971 (Fair)	3250*
656, 1970 (Fair)	3250*
656, 1970 (Fair)	2600*
656, 1968 (Fair)	2600*
666, 1975 (Fair)	3500*
706, 1962 (Fair)	2200*
706, 1963 (Fair)	2700*
706, 1963 (Good)	4500*
706. 1963 (Rough)	3100*
706, 1965 (Rough)	1550
706, 1967 (Good)	3000*
706, 1964 (Rough)	2250*
756, 1970 (Fair)	2050*
756, 1970 (Fair)	3400*
756, 1968 (Fair)	2800*
766, 1974 (Fair)	4050*
784, 1978 (Good)	7000*
806, 1965 (Fair)	3800*
806, 1965 (Rough)	2850*
806, 1964 (Fair)	3650
806, 1965 (Fair)	2600*
806, 1964 (Rough)	1400
806 diesel, 1965 (Fair)	5300*
806 diesel, 1963 (Fair)	4800*
826, 1969 (Good)	6200*
856 diesel, 1971 (Good)	6200*
856, 1970 (Good)	5600*
856, 1969 (Fair)	6000*
856, 1968 (Fair)	6200
856, 1970 (Fair)	3750
966, 1972 (Good)	8500
966, 1972 (Fair)	6900
966, 1975 (Good)	8150
966, 1973 (Fair)	5500*
966 diesel, 1976 (Fair)	8100*
1066, 1975 (Fair)	6500*
1066, 1974 (Fair)	6900
1086, 1978 (Fair)	12,500*
1086, 1977 (Good)	13,400
1086, 1978 (Fair)	7600
1206, 1965 (Rough)	4800
1206, 1966 (Rough)	4700
1206, 1966 (Fair)	5800
1206, 1965 (Good)	5550
1256 diesel, 1969 (Fair)	6100*
1256, 1970 (Rough)	5000*
1456, 1968 (Good)	7400
1456, 1971 (Rough)	4150
1466, 1972 (Fair)	4250*
1466, 1975 (Fair)	7750*
1466, 1972 (Rough)	4250*
1466, 1975 (Good)	8200
1466, 1975 (Fair)	8100*
1466, 1972 (Good)	7400*
1566, 1975 (Fair)	6500
1566, 1976 (Good)	10,600*
1566, 1972 (Fair)	7750*
3588, 1980 (Good)	16,500*

MINNEAPOLIS-MOLINE TRACTORS

Jet Star,	350
M-670 diesel, 1965 (Fair)	2000
G-900 diesel, (Fair)	2800
G-900, (Fair)	3000

DEUTZ TRACTOR

D4004, 1980 (Excellent)	4075

MASSEY-HARRIS TRACTOR

44, 1949 (Fair)	650

FORD TRACTORS

8N, 1951 (Fair)	1200
8N, 1950 (Fair)	1550
8N, 1952 (Good)	1475*
9N, 1946 (Rough)	875*
9N, 1944 (Rough)	875*
9N, 1943 (Rough)	800*
9N, 1946 (Fair)	1275
9N, 1943 (Fair)	1100
600, 1957 (Fair)	2100*
800, 1956 (Fair)	2050
901, 1958 (Good)	2625
2000, 1963 (Fair)	2725
3400, 1969 (Rough)	3100*
3000, 1970 (Fair)	3300
4000, 1967 (Fair)	3050
4000, 1967 (Fair)	3200*
4000, 1974 (Good)	4500*
4000, 1968 (Fair)	2800
4000, 1973 (Fair)	2850
5000, 1966 (Rough)	3000*
5000, 1974 (Good)	5850
5000, 1974 (Good)	5100*
6100, 1961 (Fair)	1200*
8000, 1973 (Fair)	4100*
8000, 1972 (Rough)	4300*
4400, 1973 (Fair)	3600
6600, 1976 (Good)	7300*
FW-20, 1978 (Good)	13,500*
880,	2700
Jub., 1953 (Fair)	2150
Jub., 1953 (Good)	2250
Jub., 1954 (Fair)	1850
Jub., 1953 (Rough)	2300
Jub., 1953 (Fair)	2050

ALLIS-CHALMERS TRACTORS

B, 1977 (Fair)	2600
C, 1950 (Rough)	600
G, 1952 (Fair)	1000*
WD-45, 1953 (Fair)	725
WD-45, 1954 (Rough)	575
WD-45, 1949 (Rough)	500*
D-14,	1475
D-15, 1966 (Good)	2450
D-17, 1964 (Good)	1500*
D-17, 1966 (Fair)	2600*
D-17, 1963 (Good)	1925*
D-17, 1963 (Fair)	1450
D-17, 1963 (Rough)	1625
D-17, 1962 (Rough)	1575
D-21, 1966 (Fair)	4400*
180 diesel, 1970 (Fair)	4300

(More...)

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Auctions *(continued)*

190, 1970 (Fair)	2300*
190XT diesel, 1968 (Good)	3400
190XT, 1957 (Fair)	4800
190XT, 1965 (Rough)	2800*
190XT, 1966 (Fair)	3200*
190XT, 1970 (Good)	5300*
190XT, 1970 (Fair)	4050
190XT, 1970 (Good)	5250
220, 1972 (Fair)	3900*
7040, 1975 (Good)	6250*

WHITE TRACTORS

2-150,	7500*
4-180,	10,000

CASE TRACTORS

400, 1957 (Rough)	675
530, 1964 (Rough)	1100*
630, 1963 (Fair)	1250*
730, 1966 (Fair)	2400*
830, 1966 (Fair)	1525
900, 1957 (Rough)	525
1030 diesel, 1965 (Fair)	3400
1030, 1968 (Good)	3600*
1030 1968 (Good)	2950
1370, 1973 (Fair)	9700
2670 diesel, 1972 (Fair)	10,250*

JOHN DEERE TRACTORS

A, 1951 (Fair)	450*
B, 1944 (Rough)	500
70 diesel,	350
60, 1954 (Rough)	975
530, 1960 (Good)	1425*
G,	750
620, 1957 (Rough)	1900*
620, 1956 (Fair)	1900
630, 1959 (Good)	1800*
630, 1958 (Fair)	2150
720 diesel, 1957 (Rough)	1050
720, 1957 (Fair)	1300
720 diesel, 1957 (Fair)	1600*
720, 1957 (Fair)	1575
720 diesel, 1955 (Fair)	1050*
730 diesel, 1960 (Good)	1650
730, 1959 (Good)	3800
820, (Fair)	2250*
820, 1956 (Fair)	1700*
830, 1958 (Good)	2250
1520, (Fair)	3300
2010, 1961 (Rough)	1800*
2010 diesel, 1962 (Fair)	3200
2010, 1962 (Rough)	3400*
2030 diesel, 1978 (Fair)	6500*
2030, 1974 (Fair)	5000*
2030, 1974 (Fair)	3100
2030, 1974 (Fair)	3600
2240, 1979 (Fair)	5100*
2440 diesel, (Rough)	5900
2840 diesel, 1979 (Good)	7400*
2840, 1978 (Excellent)	9700
2840, 1978 (Fair)	8700
3010 diesel, 1962 (Good)	4150
3010, 1962 (Rough)	2400
3010, 1962 (Fair)	3350
3020, 1966 (Good)	4450
3020, 1967 (Good)	4500*
3020, 1966 (Rough)	3700*
4010, 1963 (Rough)	4050
4010, 1962 (Fair)	3600*
4010, 1963 (Fair)	1900*
4010 diesel, 1963 (Fair)	4200*
4010 diesel, 1962 (Fair)	3400*
4010 diesel, 1964 (Rough)	3800*
4010,	4400
4020, 1966 (Fair)	5700*
4020, 1965 (Good)	5300
4020, 1970 (Good)	7200
4020, 1967 (Fair)	5100
4020 diesel, 1966 (Fair)	4600*
4020 diesel, 1968 (Good)	7000*
4020 diesel, 1965 (Good)	5500
4020, 1968 (Rough)	3050
4020 diesel, 1964 (Fair)	3250*
4020, 1965 (Fair)	3150*
4020 diesel, 1967 (Fair)	4700*
4020 diesel, 1965 (Good)	5700
4020 diesel, 1968 (Fair)	5600
4020 diesel, 1964 (Fair)	5000*
4020 diesel, 1966 (Fair)	5200*
4020, 1965 (Fair)	3800*
4020 diesel,	5500
4020 diesel, 1967 (Fair)	6000*
4020 diesel, 1965 (Fair)	5200*
4020, 1965 (Fair)	5250*
4230, 1973 (Fair)	10,250*
4230, 1976 (Fair)	8100*
4320 diesel, 1971 (Fair)	7300*
4430 diesel, 1976 (Good)	12,800*
4430, 1975 (Excellent)	12,600*
4430 diesel, 1975 (Fair)	9000*
4430,	12,750
4430 diesel, 1977	11,150*
4430,	13,000
4430, 1975 (Good)	14,300
4630 diesel,	8500
7520 diesel, 1972 (Good)	13,500*
2130 diesel, 1976 (Fair)	2700

FERGUSON & MASSEY-FERGUSON

35, 1963 (Fair)	2425*
35, 1960 (Fair)	2300*
85, 1960 (Fair)	1200*
85, 1962 (Fair)	1700
165, 1968 (Fair)	3300*
165, 1971 (Fair)	2500*
165, 1970 (Fair)	3200*
165, 1969 (Fair)	3000*
165, 1972 (Fair)	2850
1085, 1976 (Good)	10,500*
1085, 1975 (Rough)	4350
11100, 1969 (Rough)	4000
1105, 1977 (Rough)	6100*
1130, 1973 (Rough)	7500
1135, 1975 (Good)	6500*

OLIVER TRACTORS

77, 1950 (Rough)	475
88, 1952 (Rough)	575
1250, (Fair)	1700
1650, 1965 (Fair)	3325
1750, 1966 (Rough)	3000*
1850, 1967 (Fair)	3700*
1850, 1965 (Fair)	3450
1855, 1973 (Fair)	4600*
1855, 1970 (Fair)	5800
1950, 1966 (Fair)	2100*
1955, 1972 (Fair)	4500
2-45, 1980 (Good)	6500

DAVID BROWN TRACTORS

780, 1967 (Good)	1300
990, 1964 (Rough)	1000*
1200, 1969 (Fair)	2500
1200, 1974 (Rough)	3700*
1200, 1970 (Fair)	2500

STEIGER TRACTOR

Bearcat, 1971 (Good)	12,000

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JULY

1984

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EDITORIAL
Bill Fogarty, Editor
Scott R. Nesbitt, Managing Editor
Irma Allread, Associate Editor
Kevin Callahan, Art Director
Anita Blattner, Graphic Designer
Pat Blanton, Editor, Product File
Jim Baumberger, Editor, Red Book

Contributing Editors:
Frank Buckingham,
Agricultural Engineering
Glenn S. Hensley, Dealer Topics

CIRCULATION
John Arnst, Director
Evelyn Rogers, Manager
Dee Manies, Reader Correspondent

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Ron Wall,
National Sales Manager

Susan Birnbaum,
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R. J. Hancock, President
John Wickersham, Publisher

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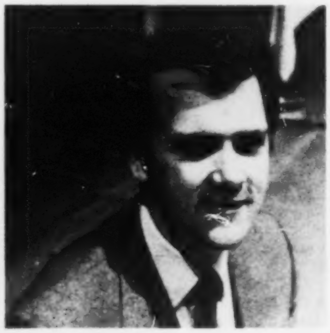

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7: Conventions, Shows and Fairs, 1984-1985. Our annual listing of the agricultural machinery industry's most important gatherings in North America and abroad.

12: McDaniel's Farm Store Operation. This Illinois IH dealer put up a new dealership, added a variety of rural-oriented products – and is meeting a lot of new customers.

34: Marketers Seek Ways to Adapt to a Downscaled Industry. A report on the FIEI Marketing & Management Conference.

42: Keeping in Touch with FWA Tractors. Because their drive system is different, front-assist tractors don't respond to the hitching and weighting schemes that seem to work for 2WD machines.

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I&T Update

U.S. Retail Sales in May: Softer in Most Categories

U.S. retail sales of farm equipment, according to the Farm & Industrial Equipment Institute's flash report, were lower than in the same 1983 month in most categories. But self-propelled combine sales, a down market through the first four months, picked up.

Unit Retail Sales

	May			January-May		
	1984	**1983**	**Pct. Change**	**1984**	**1983**	**Pct. Change**
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	6,356	5,606	+13.4	21,550	19,884	+ 8.4
40-99 hp	3,771	3,668	+ 2.8	17,468	15,544	+12.4
100-139 hp	929	1,414	−34.3	4,648	6,679	−30.4
Over 140 hp	1,128	1,308	+13.8	6,467	5,008	+29.1
Total 2-wheel drive	**12,184**	**11,996**	**+ 1.6**	**50,133**	**47,115**	**+ 6.4**
4-wheel drive						
Under 200 hp	167	156	+ 7.1	808	766	+ 5.5
Over 200 hp	250	263	− 4.9	1,281	1,020	+25.6
Total 4-wheel drive	**417**	**419**	**− 0.5**	**2,089**	**1,786**	**+17.0**
Total All Tractors	**12,601**	**12,415**	**+ 1.5**	**52,222**	**48,901**	**+ 6.8**
S-P Combines	438	363	+20.7	2,905	4,008	−27.5
Balers (under 200-lb. bales)	696	764	− 8.9	2,336	2,500	− 6.6
Forage Harvesters (shear-bar type)	190	242	−21.5	706	868	−18.7
Mower-Conditioners	1,328	1,422	− 6.6	4,038	4,023	+ 0.4

MF's 1st Period In the Black

Massey-Ferguson has reported a first-quarter net profit of $2.4 million, compared with last year's first-period loss of $18 million. Sales for the period were $365 million, down 9 per cent from the year-earlier quarter, with farm and industrial equipment lines off 13 per cent to $300 million and diesel engines sales up 11 per cent to $65 million.

North American sales were up 5 per cent to $122 million while sales in Europe fell 27 per cent to $147 million. Sales in Asia, Africa and Australasia rose 19 per cent to $88 million and Latin American volume declined 36 per cent to $8 million.

Des Moines Gets 1985 Components Expo

After three years in Kansas City, the International Agri-Component Exposition is moving to a new location and getting a modified name.

The show will move to Des Moines next year, and will be called the 1985 Agri-Component Exposition International. Show dates are May 14, 15 and 16 at the Veterans Memorial Auditorium.

The show's producer, Dawn Morris, of Intercontinental Trade Shows, Inc., said research and discussions with the show's advisory council indicated the move to Des Moines would make the exposition more accessible to a greater number of exhibitors and attendees.

The Expo is the original trade show devoted to suppliers and purchasers of components for the agricultural machinery industry.

IH Cuts Losses In 1st Half

International Harvester Co. had agricultural equipment sales of $717 million in the first six months of fiscal 1984, an 8 per cent increase on 1983's $662 million. Second quarter farm equipment sales were $400 million, off 3 per cent from the same 1983 period.

Total company sales were $2.2 billion, up 30 per cent, for the half year. The company had a loss from continuing operations (before unusual items) of $62 million for the six months, compared with 1983's $250 million. Net loss for the six months was $56 million compared with $270 million a year earlier.

Briefly....

The American Society of Agricultural Engineers has revised several safety standards, with added requirements and expanded information. They are "Safety for Agricultural Equipment" (S318.7), "Safety for Permanently Installed Farmstead Equipment" (S354), "Safety for Agricultural Auger Conveying Equipment" (S361.2T), "ROPS for Wheeled Agricultural Tractors" (S383.1), and "Operator Controls on Agricultural Equipment" (S335.3). ASAE has also adopted a new standard, "Safety Signs" (S441).

April inventory levels of farm tractors in the U.S. were down slightly from a year earlier—from 110,732 to 106,937 units. Reductions were sharpest among four-wheel-drive units and two-wheel-drive tractors of 100 to 139 hp; supplies of bigger two-wheelers increased. Inventories of self-propelled combines were about even with a year earlier at 13,868 units. Cornhead supplies declined substantially from 11,307 units as of April 30, 1983, to 9,174 a year later. Grinder-mixers: down from 3,490 to 3,083 units. (Source: FIEI Retail Sales Report.)

France's farm equipment industry group, SYGMA, reports that tractor sales were off 3 per cent last year from 1982 to 38,873 units. Domestic sales were approximately 21,600 units, the rest export. Combine sales fell 17 per cent to 1,570 units, 888 of them going to export markets.

Allied Agrees To Buy Avco's New Idea Div.

Allied Products Corp., Chicago, has reached an agreement in principle to acquire from Avco Corp. its New Idea Farm Equipment Div. According to Richard A. Drexler, president of Allied, the acquisition will increase Allied's annual farm equipment revenues to approximately $140 million, double present revenues.

Allied owns Bush Hog, Selma, Ala., shortline manufacturer, which last year acquired the Kewanee Farm Equipment Div. from Chromalloy American.

Deere's 6-Month Sales Up 14 Pct. To $2.1 Billion

Deere & Co. sales in the first six months of fiscal 1984 (ended April 30) were $2.1 billion, a 14 per cent increase. In the second period, sales were up 23 per cent at $1.2 billion.

Earnings were $41.3 million for the half year and $39.3 million for the second quarter, compared with 1983's losses of $39.8 million and $11.3 million.

Farm equipment sales for the quarter were up 12 per cent to $990 million and for the six months up 5 per cent to $1.709 billion. Industrial sales went up sharply—by 96 per cent to $253 million for the quarter and 68 per cent to $420 million for the half-year.

Trade receivables were $3.049 billion on April 30 compared with $2.952 billion a year earlier and $2.724 billion Oct. 31.

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

YODER & FREY, INC.
Archbold, Ohio
May 8, 1984

INTERNATIONAL HARVESTER TRACTORS

C, 1951 (Rough)	660*
Sup. A, 1952 (Good)	2200
A, 1949 (Fair)	1700*
A, 1945 (Rough)	380
A, 1947 (Rough)	500
Cub, 1951 (Rough)	1100
Cub, 1959 (Good)	1300
Cub, 1951 (Rough)	800*
154 Lo-boy, 1970 (Fair)	2200
184, 1975 (Fair)	2525*
184, 1976 (Fair)	2175
H,	425
H, 1949 (Rough)	425
H,	180
M, 1948 (Rough)	575
M, 1949 (Rough)	750*
M, 1942 (Rough)	650
Sup. M, 1952 (Rough)	875
Sup. M, 1952 (Rough)	775
140, 1960 (Fair)	2300*
240, 1958 (Rough)	975
240, 1960 (Rough)	850*
300, 1956 (Fair)	1850*
300, 1955 (Fair)	775
340, 1960 (Fair)	2125
100, 1955 (Fair)	2000*
450 diesel, 1956 (Fair)	850*
450, 1956 (Fair)	1100*
450 diesel, 1957 (Rough)	550
460, 1960 (Fair)	1150*
504, 1964 (Fair)	3250
560, 1961 (Good)	1800
560, 1959 (Rough)	1800*
560, 1960 (Fair)	1300*
560 diesel, 1960 (Fair)	2700
560, 1959 (Good)	1950
666, 1972 (Good)	5400*
706 diesel, 1964 (Rough)	3000*
706, 1966 (Fair)	2750*
766 diesel, 1972 (Rough)	4000
784 diesel, (Good)	6250*
806 diesel, 1966 (Rough)	2750
806, 1964 (Fair)	3500
806 diesel, 1965 (Fair)	5100
806 diesel, 1964 (Rough)	3200*
806 diesel, 1964 (Fair)	2700*
856 diesel, 1968 (Fair)	5700*
856,	3600
856, 1970 (Fair)	6000*
856, 1969 (Fair)	5800*
856, 1968 (Rough)	6200
966, 1974 (Good)	6600
966, 1974 (Fair)	8200*
966, 1973 (Good)	8000*
1026, 1970 (Fair)	3900*
1066 diesel, 1972 (Fair)	5100*
1066 diesel, 1972 (Fair)	6350
1066 diesel, 1975 (Fair)	4475
1086, 1978 (Good)	11,400
1086, 1978 (Fair)	11,750*
1206, 1965 (Fair)	5100
1256 diesel, 1971 (Fair)	6000*
1466, 1973 (Fair)	6600*
1466. 1973 (Fair)	7050
1566 diesel, 1975 (Fair)	7800*
1566, 1975 (Good)	9000*
1566, 1975 (Fair)	7300*
1586, 1979 (Fair)	12,700*
3588, 1977 (Good)	14,000*
3588, 1978	18,000*
3588, 1978 (Fair)	15,000*
574, 1975 (Good)	5500

FORD TRACTORS

8N,	1325
8N, 1950 (Good)	1075
8N, 1950 (Fair)	1375
8N, 1951 (Fair)	1500
9N, 1942 (Fair)	900*
9N, 1940 (Rough)	850*
9N, 1943 (Fair)	1600*
9N, 1943 (Fair)	975
9N, 1942 (Fair)	1075
600, 1953 (Fair)	1500*
601, 1957 (Fair)	2150*
800, 1957 (Fair)	2300*
900, 1957 (Fair)	1175
3000 diesel, 1967 (Fair)	3000*
841, 1957 (Good)	2100
841, 1956 (Fair)	2275*
4000, 1969 (Good)	4525
5000, 1974 (Fair)	4300
5000 diesel, 1967 (Fair)	4450*
5000 diesel, 1974 (Good)	5850*
5000 diesel, 1965 (Fair)	3800
5000, 1969 (Good)	4150
5000 diesel, 1972 (Fair)	5300*
6000, 1961 (Rough)	1175
6000, 1963 (Fair)	1050*
6600 diesel, 1977 (Good)	6500*
8000, 1972 (Fair)	5100*
9600, 1975 (Fair)	5550
3400, 1965 (Fair)	3300*
TW-30, 1981 (Good)	21,000*
Dexta, 1960 (Fair)	1400*
9700, 1978 (Good)	12,000*
6[illegible]0, 1956 (Fair)	1750*
[illegible]., 1953 (Fair)	2000*
641, 1957 (Fair)	2300*

JOHN DEERE TRACTORS

A, 1951	350
A, 1946 (Fair)	820
B, 1951 (Rough)	190
G, 1950 (Fair)	710

(More...)

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Auctions *(continued)*

720,	1075
720, 1956 (Rough)	1000*
730 diesel, 1957 (Fair)	2500*
730 diesel, 1958 (Rough)	1075
2010, 1961 (Rough)	1900
2020 diesel, (Fair)	3975
2030 diesel, 1974 (Fair)	6000*
720 diesel, 1957 (Rough)	1050
3020, 1967 (Rough)	3400*
3020 diesel, 1961 (Good)	4150
4010 diesel, 1963 (Rough)	2950
4010, 1962 (Rough)	3000*
4020 diesel, 1967 (Fair)	4700*
4020 diesel, 1966 (Rough)	3800*
4020 diesel, 1965 (Fair)	5550
4020 diesel, 1964 (Rough)	2800
4020 diesel, 1967 (Fair)	6025
4020 diesel, 1964 (Good)	5800
4020 diesel, 1964 (Fair)	4400
4020, 1968 (Good)	7300
4020 diesel, 1965 (Fair)	5250
4020, 1965 (Fair)	7450
4020 diesel, 1966 (Fair)	5700*
4230, 1975 (Fair)	9000*
4230, 1974 (Fair)	8100*
4230, 1973 (Good)	9500*
4230, 1975 (Good)	11,750
4240 diesel, 1979 (Fair)	16,500*
4320 diesel,	7200
4430 diesel, 1975 (Good)	12,000*
4430, 1975 (Fair)	9600*
4430, 1976 (Fair)	11,300
4430, 1975 (Fair)	10,650
4520, 1970 (Fair)	6600
2130, 1975 (Fair)	4500*

FERGUSON & MASSEY-FERGUSON TRACTORS

TO-30, 1950 (Fair)	1100
F-20,	220
35 diesel, 1960 (Good)	1300*
65 diesel, 1962 (Fair)	2450
65 diesel, 1960 (Rough)	1678
65, 1960 (Fair)	2100*
65 diesel, 1961 (Fair)	1450
165 diesel, 1967 (Fair)	2800*
165 diesel, 1969 (Fair)	3800*
180 diesel, 1967 (Fair)	3400
275 diesel, 1979 (Rough)	4200
1105 diesel, 1976 (Rough)	4600
1135, 1976	8500*
1150, 1971 (Fair)	5000*

ALLIS-CHALMERS TRACTORS

B, 1947 (Fair)	1050*
B, 1947	390
CA,	280
G, cult., 1950 (Fair)	1250*
G, cult., 1950 (Fair)	825*
WD, 1951 (Rough)	420
WD, 1946 (Rough)	410
WD,	400
WD,	610
WD, 1951 (Good)	925
D-15, 1966 (Fair)	1175
D-17, 1966 (Fair)	1250*
D-17, 1963 (Fair)	1500*
D-21,	4600
190, 1965 (Fair)	2500
190, 1965 (Fair)	2100
190XT, 1967 (Fair)	5050
190XT, 1969 (Fair)	3200
190XT, 1965 (Fair)	4200*
190XT, 1965 (Rough)	3200
7030, 1977 (Excellent)	8100*
7040, 1976 (Good)	7100

CASE TRACTORS

600, 1956 (Rough)	1200*
600, 1957 (Rough)	875*
730, 1964 (Fair)	2900*
930, 1965 (Fair)	1500
1070, 1971 (Fair)	4800*
2670, 1972 (Good)	9250*

COCKSHUTT TRACTOR

E-4, Idr.,	450

OLIVER TRACTORS

77, 1951 (Fair)	450*
55, Idr., 1960 (Rough)	2450
1600, 1961 (Fair)	2300
1755, (Fair)	4100*
1755, 1975	6350
1755, 1972 (Fair)	4600
1800, 1962 (Rough)	2050
1800 diesel,	1850
1800, 1963 (Fair)	1600

DAVID BROWN TRACTOR

990, 1965 (Rough)	1100*

MINNEAPOLIS-MOLINE TRACTORS

Jet Star	2100*
G-1000	700*

JONES FARM EQUIPMENT CO.
Dothan, Alabama
May 8, 1984

ALLIS-CHALMERS TRACTOR

D19, diesel, 1962 (Good)	1700

DAVID BROWN TRACTORS

990 diesel, 1964 (Fair)	1025
990 diesel, 1964 (Rough)	500

FORD-FERGUSON TRACTORS

9N, 1944 (Good)	1050*
9N, 1944 (Good)	1050*

FORD TRACTORS

3000 diesel, 1973 (Rough)	2550
3000 diesel, 1968 (Good)	3000*
3000 diesel, 1966 (Rough)	2550
2000 diesel, 1966 (Fair)	2300*
641, 1958 (Good)	1985
640, 1957 (Excellent)	2450*
541 diesel, 1958 (Good)	1500*
Dexta, 1959 (Good)	1300*
Jub., 1953 (Excellent)	2000*
Jub., 1953 (Excellent)	1900
Jub., 1953 (Excellent)	2000
Jub., 1953 (Excellent)	2150*
8N, 1952 (Excellent)	1800*
8N, 1951 (Good)	1600*
8N, 1950 (Fair)	1175
8N, 1949 (Fair)	1075*
8N, 1949 (Good)	1400*
8N, 1949 (Fair)	1000
8N, 1948 (Fair)	1025
8N, 1948 (Good)	1375
8N, 1948 (Rough)	425

INTERNATIONAL HARVESTER TRACTORS

1206 diesel, 1966 (Fair)	3400*
504 diesel, 1962 (Rough)	1000
454 diesel, 1972 (Fair)	2500*
454 diesel, 1972 (Rough)	1950*
454 diesel, 1971 (Good)	2700
444 diesel, 1968 (Fair)	2000*
340 diesel, 1962 (Fair)	950
H, 1944 (Fair)	250
140, 1958 (Fair)	1200

JOHN DEERE TRACTORS

4430 diesel, 1973 (Fair)	8750*
4020 diesel, 1966 (Fair)	3800
2840 diesel, 1979 (Good)	6400*
2640 diesel, 1978 (Good)	6800*
2630 diesel, 1976 (Good)	4700*
2630 diesel, 1975 (Excellent)	6000*
2510 diesel, 1969 (Fair)	1950
2040 diesel, 1979 (Excellent)	8000
2030 diesel, 1973 (Excellent)	4650
1020, 1967 (Fair)	2600*
1010, 1961 (Rough)	625
430, 1959 (Good)	1425
400, (Rough)	825
40, 1953 (Fair)	1050*

OLIVER TRACTOR

1655 diesel, 1973 (Good)	3250*

MASSEY-FERGUSON TRACTORS

1135 diesel, 1977 (Rough)	3500
1105 diesel, 1977 (Good)	5000*
1085 diesel, 1974 (Rough)	2700*
285 diesel, 1976 (Fair)	4400*
275 diesel, 1975 (Fair)	4750
265 diesel, 1975 (Fair)	4700
245 diesel, 1978 (Excellent)	5400*
245 diesel, 1978 (Good)	4600*
235, 1975 (Good)	3750
180 diesel, 1967 (Good)	3300
180 diesel, 1967 (Good)	3000
175 diesel, 1973 (Good)	3200
175 diesel, 1967 (Good)	3400*
175 diesel, 1967 (Good)	3000
165 diesel, 1973 (Fair)	3700
135 diesel, 1974 (Excellent)	3800*
135 diesel, 1972 (Excellent)	4000
135 diesel, 1967 (Fair)	3000
135 diesel, 1966 (Fair)	3000*
135 diesel, 1966 (Rough)	2400
130, mo., 1967 (Rough)	1225
35 diesel, 1963 (Excellent)	2550
TO30, 1952 (Fair)	1000
TO30, 1952 (Fair)	900
TO20, 1950 (Good)	1050
TO20, 1949 (Good)	1025

NOTES:
Prices reported are for individual sales at wholesale on an "as is," "cash and carry" basis. Prices reported are **not** averages.

Condition Classifications:
EXCELLENT: Engine in perfect condition, 400 to 600 hours of use. Rubber – 80% tread remaining, no breaks or cracks. Paint – original and bright. General appearance: excellent.

GOOD: Engine in good running condition. Rubber – 70% tread remaining, no breaks or cracks. Paint – original or a good repaint job. General appearance: good over-all.

FAIR: Engine possibly in need of a minor overhaul. Rubber – 60% tread remaining, some cracking evident in sidewalls. Paint – only fair, weathered and some rust apparent. General appearance: worn, some dents, minor parts (gage covers, etc.) missing or broken.

ROUGH: Engine obviously in need of a major overhaul. Rubber – smooth. Paint – scarred, weathered, rusty. General appearance: dents, ruptures, broken parts, loose wires, components (such as lights) broken, missing or inoperative.

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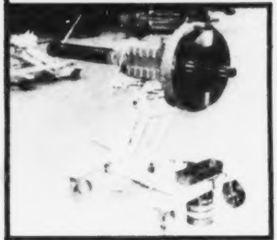

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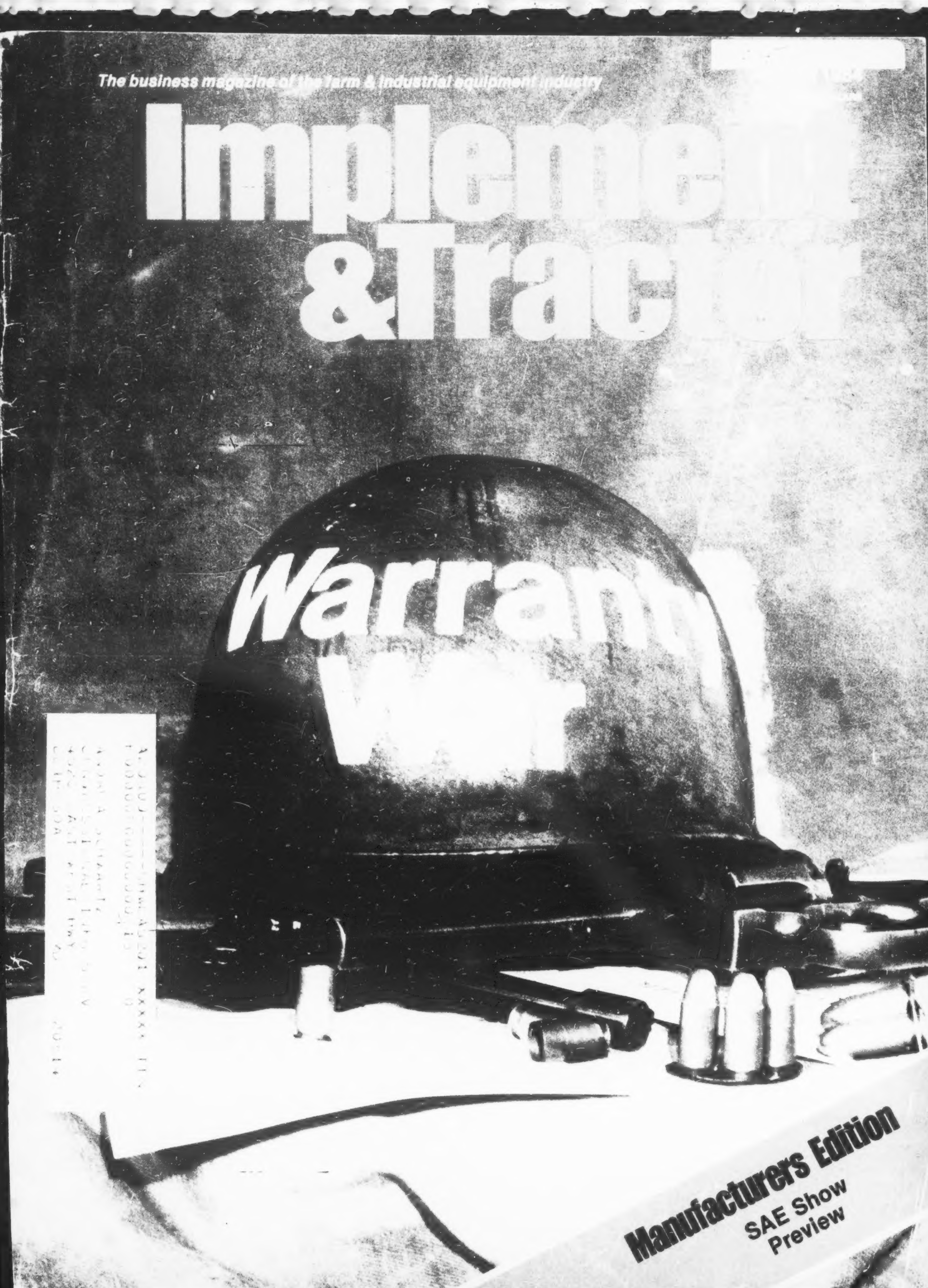
Implement & Tractor



Warranty War

Manufacturers Edition

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EDITORIAL
Bill Fogarty, Editor
Scott R. Nesbitt, Managing Editor
Irma Allread, Associate Editor
Kevin Callahan, Art Director
Anita Blattner, Graphic Designer
Pat Blanton, Editor, Product File
Jim Baumberger, Editor, Red Book

Contributing Editors:
Frank Buckingham,
Agricultural Engineering
Glenn S. Hensley, Dealer Topics

CIRCULATION
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ADMINISTRATION
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Implement & Tractor

The business magazine of the farm and industrial equipment industry

August 1984 • Vol. 99 • No. 10

page 42

8: **Gehl Co.: Very Live at 125.** The largest privately-owned shortline company is celebrating its 125th anniversary.

12: **War is Hell!** And so is keeping track of competing warranties in the tractor and combine market. Here's a look at who's doing what in the warranty war.

16: **Harry, Did You Have to Leave Your Tie?** A salute to Harry Ferguson, who, if he was alive today, would be 100 years old this year. Managing Editor Scott Nesbitt focuses on his promotional talent.

26: **Reflections on the Art of Dealer Development.** George Freshwater, former dealer development manager for Sperry New Holland, talks about the special position the DD man has in his company.

30: **The New Little Diesels.** While filling the need for long-lived small engines, the new crop of diesels present some interesting possibilities for farm machinery dealers.

34: **Latest Entrants in the Tractor Market Race.** A quick review of seven recently introduced tractors from five manufacturers.

42: **Get Rid of Excess, Find What's Needed.** Two innovative companies take on unwanted parts inventories from dealers, and help them find what they *do* need.

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I&T Update

U.S. Retail Sales Slumped in June

Retail sales of farm tractors in the U.S. were off in June by 7.6 per cent, but total unit volume for the first half was up from 1983 by 3.4 per cent.

	Unit Retail Sales					
	June			January-June		
	1984	1983	Pct. Change	1984	1983	Pct. Change
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	6,804	6,688	+ 1.7	28,557	26,572	+ 7.5
40-99 hp	4,264	5,036	− 15.3	21,518	20,580	+ 4.6
100-139 hp	1,025	1,378	− 25.6	5,623	8,057	− 30.2
Over 140 hp	1,013	1,095	− 7.5	7,521	6,103	+ 23.2
Total 2-wheel drive	**13,106**	**14,197**	**− 7.7**	**63,219**	**61,312**	**+ 3.1**
4-wheel drive						
Under 200 hp	154	200	− 23.0	964	966	− 0.2
Over 200 hp	282	262	+ 7.6	1,557	1,282	+ 21.5
Total 4-wheel drive	**436**	**462**	**− 5.6**	**2,521**	**2,248**	**+ 12.1**
Total All Tractors	**13,542**	**14,659**	**− 7.6**	**65,740**	**63,560**	**+ 3.4**
S-P Combines	497	567	− 12.3	3,403	4,575	− 25.6
Balers (under 200-lb. bales)	1,553	2,022	− 23.2	3,891	4,522	− 14.0
Forage Harvesters (shear-bar type)	372	560	− 33.6	1,075	1,428	− 24.7
Mower-Conditioners	2,900	4,009	− 27.7	6,936	8,032	− 13.6

Canada Had Fair June Retail Sales

The flash report of the Canadian Farm & Industrial Equipment Institute indicated that tractor sales for June were up 19 per cent to 2,060 units. For the year, they are up 9.8 per cent to 9,650. The heaviest increases were for four-wheel-drive (up 34 per cent to 1,471) and 40-99 hp two-wheel-drive (up 30 per cent to 4,354.

Self-propelled combine sales for the first half of 1984 were up 14 per cent to 608 units after a big June (136 units, up 72 per cent). Most other unit sales were down for June.

ASAE Installs Anderson, Elects Benson Lamp

New president of the American Society of Agricultural Engineers is James H. Anderson, who is vice-provost and dean of the Michigan State U. College of Agriculture. He was installed at the ASAE summer meeting in June at Knoxville, Tenn.

Benson J. Lamp, business planning manager of Ford Tractor Operations, was named president-elect of ASAE and will assume the presidency in 1985.

Anderson formerly headed the Mississippi State U. experiment station and its agricultural engineering department, as well as the U. of Tennessee agricultural engineering department. Lamp in 18 years with Ford Tractor has served as general marketing manager for Tractor Worldwide and as European and North American marketing manager.

James K. Kensen, manager of product engineering for the John Deere Des Moines Works, was elected an ASAE fellow at the summer meeting.

Agri-tech Expo Postponed, Set For Sept., '85

Agri-tech International, the Louisville, Ky., farm equipment exposition, which was slated for Sept. 12-15, 1984, has been postponed to Sept. 11-14, 1985. The 1985 dates coincide with the annual convention of the National Farm & Power Equipment Dealers Assn., which will be held in Louisville.

The change, according to a statement by Agri-tech organizers, was made after discussions with NFPEDA officials. The exposition is a joint project of the Kentucky Fair & Exposition Center, Louisville, and Andry Montgomery Associates, London, England. NFPEDA has endorsed the event.

FWA Market News from Canada

According to the Canadian FIEI, manufacturers are expecting to sell 16,700 two-wheel-drive tractors in 1984, of which 30 per cent will include front-wheel assist.

However, in the first four months, CFIEI indicates that 36 per cent of the 4,932 tractors sold were front-wheel assist.

Canadian marketers forecast total tractor sales of 19,400 units in 1984, compared with 18,000 in 1983. First half actual sales were 9,650 units.

Case Revamps Some Ag Group Posts

J I Case Co. has restructured its Worldwide Agricultural Equipment Operations. Reporting to Jack D. Michaels, who recently joined Case from International Harvester as executive vice-president, in new positons are:

Ken Vlasek as manager, North American sales support; Robert G. Snopko as manager, North American product support; and Mark W. Huenemann as manager, dealer support.

Vlasek is responsible for parts marketing, training and market planning; Snopko oversees service and warranty policy, customer service, product field support, technical materials and product performance analysis; Huenemann covers dealer representation, dealer business systems and dealer development.

Briefly...

The Indiana Implement Dealers Assn. has formed an Outdoor Power Equipment Council. Over 100 of the group's 500 members are outdoor power equipment dealers.

A second farm equipment exposition for the People's Republic of China has been set for Mar. 12-19, 1985, at Beijing. The other event, previously announced, is scheduled for Guangzhou (formerly called Canton) Nov. 19-24, 1984. Representing the shows in the U.S. is American Exhibition Services International, Inc., Box 66373, Chicago, Ill. 60666 (312/593-2462).

Robert C. Leary has retired after 37 years with Ford Tractor Operations. His last post of assistant general manager, sales and marketing, has been given to Gorham A. Cowl, who previously was general manager of International Operations, according to Mervyn Manning, general manager of Ford Tractor.

I&T
SINCE 1886

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

YODER & FREY, INC.
Archbold, Ohio
June 12, 1984

INTERNATIONAL HARVESTER TRACTORS

Sup. C, 1952 (Fair)	950*
Sup. C, 1951 (Fair)	575
Cub, 1951 (Fair)	1500*
Cub,	860
Cub, (Fair)	725*
154 Loboy, (Fair)	2000*
184, 1976 (Fair)	2550*
H, 1947 (Fair)	575*
H, 1947 (Fair)	525*
M, 1947 (Fair)	700*
M, 1945 (Fair)	775
Sup. M, 1952 (Fair)	720
Sup. H, 1952 (Good)	1000*
100, 1956 (Fair)	1800*
100, 1955 (Fair)	1150
140, 1960 (Fair)	2400*
300, 1957 (Fair)	1100
340, 1960 (Fair)	1425
484, (New)	5000*
560, 1959 (Fair)	2250
656 diesel, 1969 (Fair)	4250*
706 diesel, 1964 (Rough)	3200
706 diesel, 1963 (Fair)	3600*
784 diesel, 1976 (Fair)	6750*
806, 1964 (Rough)	3600*
856, 1970 (Good)	5500*
1026,	4250
1206, 1965 (Good)	4600
1256, 1968 (Fair)	5550
1256 diesel, 1970 (Good)	5750
1256, 1967	5950
1256 diesel, 1970 (Fair)	3700*
1466, 1972 (Fair)	6800*
1566, 1974	8800*
1586 diesel, 1978 (Good)	12,250*

MINNEAPOLIS-MOLINE TRACTORS

Jet Star, 1963 (Fair)	1200*
UB, (Good)	220

COCKSHUTT TRACTORS

540, (Rough)	1075*
550, 1963 (Fair)	1100

MASSEY-HARRIS TRACTORS

44, 1950 (Rough)	370

WHITE TRACTORS

2-85 diesel, 1980 (Good)	8500

JOHN DEERE TRACTORS

40, 1954 (Fair)	1000
50, 1954 (Fair)	1200*
50, 1955 (Fair)	675
50, 1954 (Fair)	900*
60, 1955 (Fair)	850
60, 1953 (Fair)	625*
60, 1954 (Fair)	625
60, 1954 (Rough)	775
520, 1957 (Fair)	1650
530, 1957 (Fair)	1800
2020 diesel, (Fair)	3800*
2030 diesel, 1978 (Fair)	6250
2240 diesel, 1978 (Good)	6600*
2630, 1975 (Rough)	6300*
3010, 1963 (Rough)	2100*
3020 diesel, 1969 (Good)	4225
4010, 1963 (Rough)	3250*
4010 diesel, 1964 (Fair)	3000
4020 diesel, 1966 (Rough)	4300*
4020 diesel, 1965 (Rough)	4000
4230, 1975 (Fair)	11,000*

DAVID BROWN TRACTORS

990, 1967 (Rough)	2050
1200, 1970 (Fair)	3000*

ALLIS-CHALMERS TRACTORS

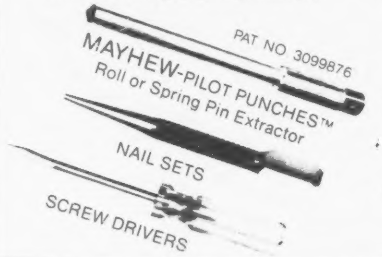
B,	200
G, 1949 (Fair)	860
G, 1950 (Fair)	1200*
G, 1948 (Fair)	1050*
WD, 1947 (Rough)	350
WD, 1948 (Rough)	450*
WD, 1948 (Fair)	420
D-17, 1966 (Rough)	1500
D-19, 1964 (Fair)	2050
D-21, 1967 (Rough)	3100*
190 diesel, 1967 (Fair)	3650
190XT diesel, 1968 (Fair)	2525
190XT diesel, 1970 (Fair)	3900*
190XT, 1969 (Rough)	2000*
190XT diesel, 1969 (Fair)	3200

CASE TRACTORS

630, 1966 (Fair)	1250
830 diesel,	1000
930.	3000
930, 1968 (Fair)	1800*
1070, 1971 (Fair)	5500*
1170, 1971 (Rough)	2900*
1194, (New)	7600*
1470 TK, 1972 (Fair)	4750

FORD TRACTORS

8N, 1951 (Good)	1300*
8N,	1250
8N, 1949 (Rough)	1000*
8N, 1952 (Good)	1350*
8N, 1949 (Fair)	1200*
8N, 1947 (Good)	1330*
8N, 1950 (Fair)	1100*
8N, 1949 (Fair)	1100
9N, 1940 (Fair)	1300
9N, 1941 (Fair)	1050*
9N, 1942 (Fair)	600*



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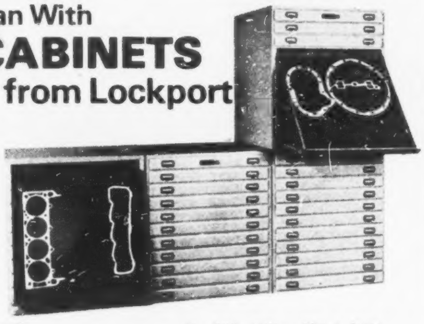

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9N, 1942 (Fair)	900
9N, 1942 (Rough)	750*
9N, 1941 (Rough)	600*
9N, 1942 (Rough)	1200
600, 1955 (Fair)	160*
900, 1955 (Rough)	1175
801, 1957 (Fair)	1700
901, 1956 (Fair)	1450*
4000, 1963 (Fair)	1950
5000 diesel, 1974 (Good)	5800
5000 diesel, 1975 (Fair)	4800*
5000, 1964 (Rough)	2500
5000, 1974 (Good)	4800*
6000, 1963 (Rough)	1200*
TW-30, 1981 (Good)	18,000
Jub., 1953 (Fair)	1500
Jub., 1953 (Fair)	1300*
801, 1956 (Fair)	1750*
861, 1958 (Fair)	3000
821, 1957 (Fair)	2000*
Dexta (Fair)	1575

FERGUSON & MASSEY-FERGUSON TRACTORS

TD-30, 1950 (Rough)	900
1150, 1970 (Fair)	5600*
35 diesel, 1961 (Rough)	2025
35 1961 (Fair)	1250
50, 1962 (Good)	1475
Sup 90, 1960 (Fair)	1660
135, 1967 (Fair)	3000*
165 diesel, 1968 (Fair)	3125*
165 diesel, 1971 (Fair)	4000
175, 1972 (Fair)	2700*
180 diesel, 1967 (Rough)	3100*
285 diesel, 1981 (Good)	8700
1135, 1976 (Fair)	8500*
1135 diesel, 1974 (Fair)	5400

OLIVER TRACTORS

550, 1963, (Fair)	1300
1250	1350
1465 diesel, (Fair)	2200
1755, 1972 (Fair)	3375
1755, (Fair)	4600*

JONES FARM EQUIPMENT CO.
Dothan, Alabama
June 12, 1984

ALLIS-CHALMERS TRACTOR

190 diesel, 1971 (Good)	3550

DEUTZ TRACTOR

4006 diesel, 1972 (Rough)	1275

MASSEY-FERGUSON TRACTORS

2805 diesel, 1977 (Fair)	7100
1130 diesel, 1972 (Rough)	2450*
1085, 1969 (Rough)	3150
1085 diesel, 1969 (Rough)	2900*
1080 diesel, 1969 (Good)	3550
285 diesel, 1976 (Fair)	4400
255 diesel, 1980 (Fair)	4300
245 diesel, 1978 (Good)	5100
235 diesel, 1975 (Excellent)	4400
235 diesel, 1975 (Rough)	2375
165 diesel, 1970 (Good)	3800*
165 diesel, 1968 (Fair)	2400*
165 diesel, 1967 (Fair)	2800*
165 diesel, 1967 (Fair)	2900
150 diesel, 1965 (Good)	3300
135 diesel, 1973 (Good)	3400
135 diesel, 1973 (Excellent)	3900
135 diesel, 1972 (Good)	3325
135 diesel, 1972 (Excellent)	3700*
135 diesel, 1971 (Excellent)	4050*
135 diesel, 1968 (Rough)	1950
135, 1968 (Fair)	2450
65 diesel, 1963 (Fair)	1250
35 diesel, 1962 (Good)	2100
35 diesel, 1961 (Fair)	1625
35, 1958 (Good)	2000*
35, 1957 (Good)	1750
35, 1956 (Rough)	1350*
TO30, 1953 (Good)	1200

FORD FERGUSON TRACTORS

9N, 1945 (Excellent)	1275
9N, 1944 (Good)	900

FORD TRACTORS

4600 diesel, (Good)	4700
4410 diesel, 1969 (Fair)	1950
4000 diesel, 1968 (Fair)	3300
4000 diesel, 1968 (Fair)	3000
4000 diesel, 1965 (Fair)	2900*
2110 diesel, 1975 (Good)	3600*
2000 diesel, 1963 (Excellent)	2350
2000, 1963 (Excellent)	2350
841 diesel, 1958 (Good)	1500
640, 1957 (Fair)	1175
640, 1956 (Excellent)	2450*
541 diesel, cult., 1959 (Good)	1200*
Jub., 1953 (Good)	1650
Jub., 1953 (Good)	1500
Dexta, 1960 (Good)	1600
8N, 1952 (Excellent)	1750
8N, 1951 (Good)	1500
8N, 1950 (Good)	1350*
8N, 1950 (Good)	1325
8N, 1949 (Good)	1500
8N, 1948 (Fair)	1050
8N, 1948 (Fair)	1100
8N, 1948 (Fair)	1275
8N, 1948 (Fair)	1250*
8N, 1948 (Fair)	1325
8N, 1948 (Fair)	1100

INTERNATIONAL HARVESTER TRACTORS

1566 diesel, cab, 1975 (Fair)	5400
1466 diesel, duals, 1973 (Fair)	5800
1086 diesel, cab, 1977 (Good)	9100*
666 diesel, 1973 (Rough)	1600
504 diesel, 1964 (Good)	2700
454 diesel, 1972 (Good)	3300*
444 diesel, 1969 (Rough)	2100*
300, 1955 (Rough)	350
100 Hydro, burned, 1974 (Rough)	2400
Cub, cult, plt, plow, 1951 (Good)	1550
Cub, cult, plow, 1950 (Good)	1500
Cub, mo., 1950 (Good)	1600
Cub, 1950 (Fair)	1050*

JOHN DEERE TRACTORS

8440 diesel, cab, duals, 1980 (Excellent)	25,000
3130 diesel, (Fair)	3300*
2640 diesel, 1977 (Fair)	4700
2640 diesel, 1977 (Good)	6800*
2510 diesel, 1968 (Excellent)	3700*
2020 diesel, 1966 (Good)	3000
2020 diesel, cab, 1966 (Good)	2900*
1020, 1966 (Rough)	1700
60, 1955 (Rough)	300*
MT, 1952 (Excellent)	1050
MT, har., 1952 (Rough)	600*

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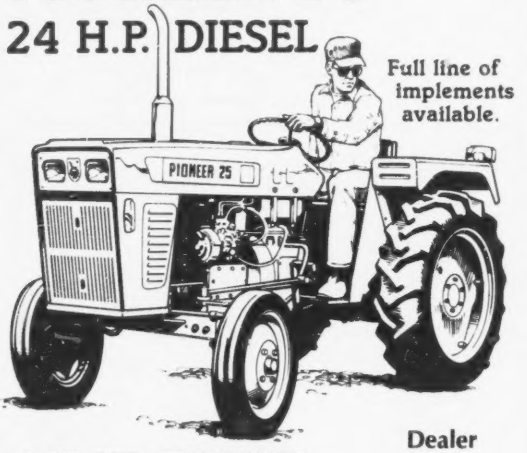

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September 1984

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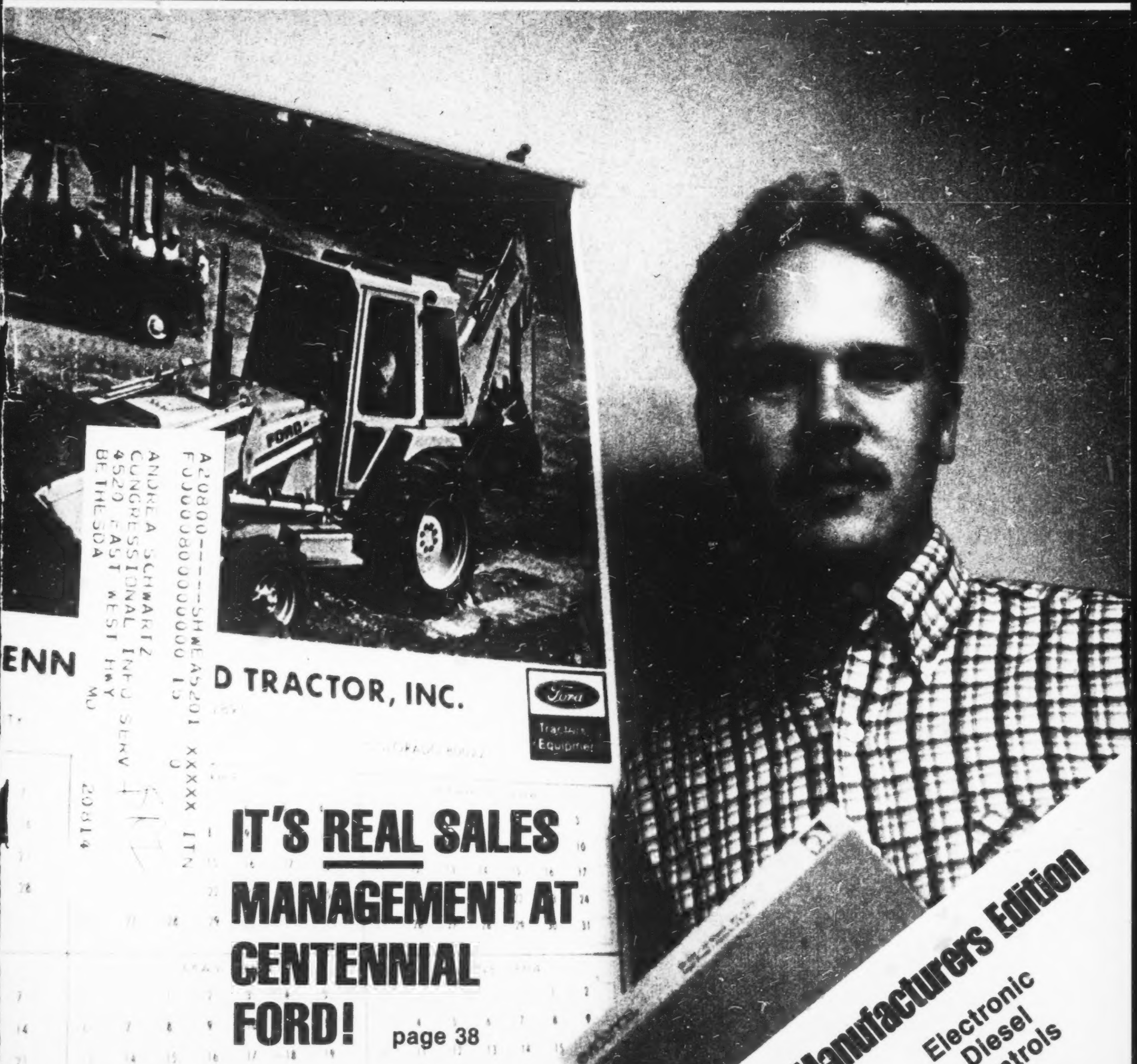
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IT'S REAL SALES MANAGEMENT AT CENTENNIAL FORD!

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Manufacturers Edition

Electronic Diesel Controls

Implement &Tractor

The business magazine of the farm and industrial equipment industry

September 1984 • Vol. 99 • No. 11

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14: **Parts Sales with a Different Twist.** A tale of will-fittin' and cherry-pickin' and helping some dealers sell parts for their competitor's equipment.

16: **Adding a Product Line.** Dealers are being asked to consider multi-line arrangements quite often today. Here are the basics to consider when that territory man approaches with an attractive offer.

20: **European Summer Show Time.** Some glimpses from the machinery showcases in England and West Germany.

24: **Dealers in Adjustment: NFPEDA in Montreal.** The annual dealer gathering reveals a hardy breed that has accustomed itself to hard times.

38: **It's Real Sales Management at Centennial Ford Tractor.** The central idea: Maximize the salesman's selling time.

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Editorial, advertising
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9221 Quivira Rd.
P.O. Box 12901
Overland Park, Kan. 66212
(a suburb of Kansas City, Mo.)
Telephone (913) 888-4664
Telex: 42-4156; Answerback
Intertec OLPK

EDITORIAL
Bill Fogarty, Editor
Scott R. Nesbitt, Managing Editor
Irma Allread, Associate Editor
Kevin Callahan, Art Director
Anita Blattner, Graphic Designer
Pat Blanton, Editor, Product File
Jim Baumberger, Editor, Red Book

Contributing Editors:
Frank Buckingham, Agricultural Engineering
Glenn S. Hensley, Dealer Topics
Michael Williams, Western Europe

CIRCULATION
John Arnst, Director
Evelyn Rogers, Manager
Dee Manies, Reader Correspondent

ABP A member of
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ADVERTISING
Ron Wall,
National Sales Manager

Susan Birnbaum,
Marketing Coordinator

Gloria Shanahan, Production
(Regional advertising sales offices
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ADMINISTRATION
R. J. Hancock, President
John Wickersham, Publisher

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I&T Update

July Retail Sales: Weak

The flash report on U.S. retail sales of farm equipment, issued by the Farm & Industrial Equipment Institute, showed a sales decline for July in all product categories except tractors under 40 horsepower. For the year, net tractor unit volume is up a bare 1.9 per cent.

	Unit Retail Sales					
	July			January-July		
	1984	**1983**	**Pct. Change**	**1984**	**1983**	**Pct. Change**
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	4,588	3,877	+18.3	33,135	30,449	+ 8.8
40-99 hp	2,966	3,165	− 6.3	24,529	23,745	+ 3.3
100-139 hp	428	1,035	−58.6	6,007	9,092	−33.9
Over 140 hp	519	1,030	−49.6	8,085	7,133	+13.3
Total 2-wheel drive	**8,501**	**9,107**	**− 6.7**	**71,756**	**70,419**	**+ 1.9**
4-wheel drive						
Under 200 hp	59	110	−46.4	1,024	1,076	− 4.8
Over 200 hp	100	239	−58.2	1,656	1,521	+ 8.9
Total 4-wheel drive	**159**	**349**	**−54.4**	**2,680**	**2,597**	**+ 3.2**
Total All Tractors	**8,660**	**9,456**	**− 8.4**	**74,436**	**73,016**	**+ 1.9**
S-P Combines	815	1,009	−19.2	4,218	5,584	−24.5
Balers (under 200-lb. bales)	1,880	2,273	−17.3	5,745	6,795	−15.5
Forage Harvesters (shear-bar type)	401	577	−30.5	1,476	2,005	−26.4
Mower-Conditioners	2,393	2,940	−18.6	9,330	10,972	−15.0

New Holland Enters Farm Computer Market

Sperry New Holland has entered the computer market with a line of personal computers called Ag-Command, to be sold to farm operators. Dave Wolf has been named head of the company's Computer Products Group.

Wolf said the group hopes to enroll several hundred dealers for training in "the next six months" from among its present farm equipment dealer organization.

The Ag-Commander is described as an enhanced version of Sperry's 256K personal computer.

Security Pacific Makes Deal for A-C Credit Corp.

Allis-Chalmers Corp. and Security Pacific Corp., Los Angeles, have signed a letter of intent for Security to acquire Allis-Chalmers Credit Corp. for essentialy book value.

ACCC, with assets of $1.3 billion, provides wholesale, rental, lease and retail financing for A-C dealers and customers.

ACCC employees will continue under the new ownership and its headquarters in West Allis, Wis., and regional offices will continue, according to an A-C release.

Deere Buys Farm Plan

Farm Plan, a financing service developed 10 years ago under joint sponsorship of the Wisconsin Farm Equipment Assn. and the United Bank of Madison, Wis., has been acquired by Deere & Co.

The plan is a means by which rural banks and merchants provide credit for farmers' purchases of agricultural inputs. Farm Plan provides administration and marketing.

Farm Plan now operates in 23 states. Deere intends to expand it to the rest of the U.S. and keep its headquarters in Madison, Wis., where it has operated under the name of Association Credit Plans. Deere said Farm Plan will continue to invite participation from farm equipment dealers of all franchises, not only Deere, as well as other farm supply firms.

Some state and regional dealer associations have contracts with Association Credit Plans which allow them to participate in the program.

Deere's Income For 9 Months: $70.8 Million

Deere & Co. has reported net income for the nine months ended July 31 at $70.8 million, compared with a nine-month loss in 1983 of $34.7 million. Nine-month sales volume was $3.2 billion, a 10 per cent rise from 1983's $2.9 billion.

Third quarter earnings were $29.4 million, including $28.5 million of income tax adjustments, compared with $5.1 million in the same period of 1983. Third period sales were $1.037 billion this year, 4 per cent more than last year's $996 million.

Trade receivables, largely dealer inventories, declined by $168 million to $2.88 billion in the third quarter. A year earlier, they were $2.795 billion and at the end of 1983 were $2.724 billion.

Briefly…

New Idea Farm Equipment Corp., recently acquired from Avco by Allied Products, has named B. L. Nielsen as vice-president and general manager, Tom Kinzenbaw as marketing vice-president, Jim Scheuerman as finance vice-president and Norb Giere as operations vice-president.

July Was Tough In Canada, Too

Retail sales in Canada were off in most product categories, according to the Canadian Farm & Industrial Equipment Institute's flash report.

Unit sales of tractors were off 2.9 per cent in July from the 1,165 sold in 1983. But volume for the year was still up 11 per cent at 11,042. Softest part of the market was two-wheel-drive tractors, off 31 per cent for July at 170 units, off 17 per cent for the year at 2,536.

Self-propelled combines: off 3 per cent in July at 214 units, but up 6.6 for the year at 804.

Big balers: up 25 per cent for July to 633, making the year-to-date just over last year, 1 per cent, at 1,199.

Farm Equipment Exports, Imports Up in 1st Half

Exports of farm equipment from the U.S. rose by 23 per cent to $1.2 billion in the first half of 1984, according to the U.S. Dept. of Commerce. Imports also increased to $895 million, a rise of 38 per cent from the same 1983 period.

Most significant increases were in exports to Australia (up 294 per cent to $108 million) and Mexico (up 154 per cent to $40 milion).

Imports from Japan were $158 million (up 69 per cent); from Italy, $78 million (up 78 per cent); from Britain, $119 million (up 47 per cent); from West Germany, $112 million (down 12 per cent). America's biggest farm equipment trading partner is Canada, which increased purchases from the U.S. by 26 per cent to $537 million and its sales by 67 per cent to $301 million.

Hesston 6-Month Sales: $105 Million

Hesston Corp.'s second quarter, ended June 30, 1984, produced sales of $63.4 million and earnings of $5.57 million; first-half sales were $105.6 million and earnings were $2.75 million.

In 1963's second period, earnings were $6.89 million on sales of $63.8 million; six-month sales in 1983 were $101.4 million and earnings were $2.02 million.

What's good, what's bad about

Adding a Product Line

Dealers are being asked to consider multi-line arrangements quite often today. Here are the basics to consider when that territory man approaches with an attractive offer.

By George Freshwater

(A retired Sperry New Holland marketing executive, the author is now vice-president of Agri-Software Div., Agri Visco, Delaware, Ohio)

■SHALL I add another line? It's a question every dealer faces sometimes, and it's important. On one hand, he must provide his customers with equipment they prefer and want. On the other, he must do a satisfactory job of representing his major supplier in the local market.

The paradox is that no one manufacturer has dominance in the marketplace with every product line he makes. For the dealer, this means that sooner or later the decision must be dealt with. It is seldom a clear-cut matter, but there are definite pros and cons. Let's take a look.

The pros

Since the major supplier can't make, or provide, everything, the dealer has a real opportunity. If he's selective and prudent, he can acquire a good mix of preferred lines that are in demand by a majority of his customers. There may turn out to be some competition with the major supplier's product array, but companies who specialize in certain product lines can sometimes offer the dealer a better mousetrap that will provide more benefits for both the customer and the dealer himself.

Adding another line will increase the number and scope of customers the dealer can do business with. If the new line already has a substantial machine population in place in the dealer's territory, increased floor traffic, parts business and shop activity should occur. Consequently, sales revenue can be generated from the newly-added line in a short time.

The dealer has already made a large investment in his business; land, buildings, facilities and people are already in place. The cost of debt reduction and/or maintenance of these assets will continue whether the new line is added or not. And the new line may boost the dealer's gross profits without a proportionate increase in his cost of doing business. To whatever extent this occurs, net profits will go up.

If gross margins increase without a corresponding increase in expenses, the break-even point will be driven lower. The result is that the new line could bring the dealer's business into the profit column sooner.

The added line gives the dealer a second source of supply. In today's market, this may seem irrelevant. But being single-sourced carries the risk of pinching off the product supply. There is always the possibility of strikes, business misunderstandings and supplier financial problems. These could adversely affect availability of product as well as dealer profit. The extra line provides some flexibility.

If the product line is new to the area, particularly new in terms of type, a new solution to farmers' problems, the chances of a substantially larger gross margin than most machines bring is possible. Most dealers give away some of their margin on deals because they know that another dealer not far away has something like it.

The cons

It's a fact of life that the dealer's business relations with his full-line supplier could become strained by adding the extra line. Most major companies look on any product duplication as an immediate threat to their business future. The dealer will have to be prepared for this and to counter it with sound, logical business answers. These might include increased floor traffic, better market share, or greater dealer stability through greater net profit.

It may be possible to do a better job with the product lines the dealer now has, making the addition of another line superfluous. A careful analysis of the dollar sales currently being produced by each of the sales, parts and shop people could be helpful. Such a study might provide guidelines as to where sales can be improved and how much is needed to raise performance to a better standard.

Generally, the more lines that are handled, the more complex the dealer's operation will be: more paperwork, more parts, more people, more perplexities. This may not always be true, but it is true that better overall management is required to effectively market additional product lines.

Is the dealer's present financial structure strong enough to service the new line? He's going to be tying up some of his working capital in parts inventory and, when he starts dealing, in used trade-ins. This situation can compound the problems of a poorly financed dealer, even affecting his security with his major supplier.

How much of the sales volume from the new line is actually business that could or would have been realized with the original line? If the sales effort that goes into the new line could have been just as productive with the original line, then nothing has been accomplished except to add to costs.

Will the addition of a new line call for a capital investment in new facilities or the purchase of special equipment? How about the investment in training that most substantial product lines require? Here, the dealer's forecast of projected

(More...)

Adding Lines *(continued)*

sales and expenses will be crucial in determining if these major steps should be taken.

Mind set

All successful endeavors start with the way we think about things. The dealer should ask some fundamental questions about attitudes or mind sets, starting with his own.

- **Will I** give this line the effort and attention it deserves?
- **Will I** be able to keep multiple suppliers happy?
- **How about** my own people? Is their attitude toward the possible addition of the line positive? Will they be at least as effective with it as with the original line?
- **How will** my customers react to my business handling two or more similar brands? Will they sense a lack of dedication and belief in the products I handle? Or will they see me as a progressive, growing enterprise seeking new opportunities of meeting their needs?

Cherry picking

Sometimes a manufacturer appoints a dealer to represent his line in an area and then learns that the dealer is interested in only one segment or product in the line. It's called "cherry picking." Whatever hopes he had for market penetration by the rest of the line are dashed, at least as long as the dealer is interested only in a narrow segment of the products.

Unless there are some unusual characteristics about the dealer's area that make all but a part of the product line truly irrelevant, the cherry-picking dealer may be outsmarting himself.

To get a good additional line, or *lines,* from which to do his cherry-picking, the dealer usually has to make some basic commitments in terms of basic parts and inventory stocking. Often he will be expected to send a service technician off for training. He hasn't invested his assets wisely.

It takes a certain sort of aggressive mind set to successfully merchandise a product line—or any one part of that product line. It often happens that the cherry-picking dealer who has hung out enough manufacturers' shingles to re-roof his place is unable to develop this aggressive attitude about any of the lines or products he has plucked off.

To all dealers who are considering adding lines: First be very analytic about the entire process, starting with your customers' present and anticipated equipment needs. Their buying preferences, both in terms of type and brand of equipment and the dealer with whom they deal, will ultimately determine whether it was a wise or unwise move to take on another line.

Good luck! It's the free enterprise system in action! I&T

Do Dealers Make Major Moves Often?

About the time that George Freshwater wrote this article I&T's marketing department was looking over some outside research they had commissioned to see what's happening in the trade. Some of the questions and replies to a dealer survey were relevant to this piece, so we grabbed the data.

The survey went to 1,000 dealers; 464 responded. They were asked if they had added a new line of a given type of product or dropped such a line in the past two years.

Farm tractors. Fifty-six of the 464 dealers (12.1 per cent) said they had added a farm tractor line; another 24 (5.2 per cent) had dropped one.

Replacement parts. Of the 464 dealers, 74 or 16 per cent had added a line of replacement parts and 14 or 3.0 per cent had dropped one.

Lawn/garden lines. Sixty-four dealers (13.8 per cent) added; 22 dealers (4.7 per cent) dropped.

Other movement

The survey indicated that in many product categories, there was as much dropping of lines as adding, or more. Thus:

	Product Line Shifts	
	Added	**Dropped**
Field cultivators	38/8.2%	24/5.2%
Moldboard plows	4/0.9	26/5.6
Chisel plows	24/5.2	28/6.0
Forage harvesters	14/3.0	28/6.0
Hay balers	36/7.8	38/8.2
Windrowers	26/5.6	26/5.6
Mower-conditioners	40/8.6	40/8.6
Grinder-mixers	24/5.2	26/5.6
Manure spreaders	22/4.8	16/3.5
Industrial tractors	18/3.9	22/4.7
Skid-steer loaders	38/8.2	36/7.8

Observers familiar with industry developments may recognize in these numbers that many of these drop-add moves reflect the decisions of some manufacturers to take certain product lines out of their offerings in recent years.

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AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT CO.
Dothan, Alabama
July 10, 1984

ALLIS-CHALMERS TRACTORS

XT190 diesel, 1972 (Fair)	2800*
B, 1946 (Fair)	390*

CASE TRACTOR

1370 diesel, 1975 (Good)	6500*

DAVID BROWN TRACTORS

990 diesel, 1968 (Good)	2000*
885 diesel, 1975 (Excellent)	2900
770 diesel, 1966 (Fair)	800

MASSEY-FERGUSON TRACTORS

1085 diesel, 1978 (Good)	3800
255 diesel, 1975 (Fair)	4250*
175 diesel, 1971 (Good)	3550
175 diesel, 1968 (Fair)	2750
175 diesel, 1967 (Good)	3300*
175 diesel, 1967 (Fair)	2850*
165 diesel, 1966 (Rough)	2300
165 diesel, 1966 (Rough)	2300
165 diesel, 1965 (Rough)	2300
150 diesel, 1965 (Fair)	2200
135 diesel, 1972 (Excellent)	4400*
135 diesel, 1969 (Good)	2600
135 diesel, 1968 (Good)	2925
135 diesel, 1967 (Good)	2950
65 diesel, 1961 (Rough)	1025
50, 1956 (Good)	2000
35, 1956 (Rough)	900
35, 1955 (Good)	2100
35, 1955 (Good)	2000
TO30, 1952 (Good)	1000*

FORD-FERGUSON TRACTORS

9N, 1946 (Excellent)	1[illegible]50
9N, 1944 (Good)	925

FORD TRACTORS

7000 diesel, 1973 (Good)	4250*
4600 diesel, 1982 (Good)	5250
4600 diesel, 1981 (Good)	5000
4000 diesel, 1966 (Fair)	3150
4000, 1963 (Fair)	1500*
4000, 1963 (Rough)	850
3000 diesel, 1969 (Excellent)	3550
3000 diesel, 1968 (Good)	3100*
3300 diesel, 1968 (Good)	2900*
3000 diesel, 1968 (Good)	3000
3000 diesel, 1966 (Fair)	2550
3000 diesel, trencher, 1966 (Rough)	2250*
3000 diesel, 1966 (Fair)	2550
2310 diesel, 1983 (Excellent)	6000*
2000, 1964 (Fair)	1300*
861, 1958 (Excellent)	2400
850, 1957 (Excellent)	2300*
850, 1956 (Good)	1800*
841 diesel, 1958 (Fair)	1175
640, 1956 (Good)	1675
541, 1958 (Good)	1350
541, 1958 (Fair)	1050
Dexta, 1959 (Good)	1500
Jub., 1953 (Good)	2000*
8N, 1952 (Good)	1225*
8N, 1952 (Good)	1500
8N, 1950 (Excellent)	1975
8N, 1949 (Good)	1425
8N, 1949 (Good)	1500
8N, 1949 (Excellent)	1750
8N, 1948 (Good)	1450
8N, 1948 (Good)	1325
8N, 1948 (Excellent)	1625

INTERNATIONAL HARVESTER TRACTORS

684 diesel, 1980 (Excellent)	6500
574 diesel, 1972 (Fair)	3,000
2504 diesel, 1963 (Fair)	625
504 diesel, 1966 (Fair)	1900
454 diesel, 1971 (Good)	3000
444 diesel, 1970 (Rough)	2200
424 diesel, 1967 (Good)	1600
B414 diesel, 1963 (Good)	1100*
140, 1962 (Good)	1700*
Cub, cult., 1952 (Good)	1650
Cub, cult., 1948 (Fair)	1025*
Cub, mo., 1948 (Fair)	750
Cub, 1948 (Good)	900

JOHN DEERE TRACTORS

4040 diesel, cab, 1979 (Good)	13,250*
4030 diesel, 1975 (Good)	7000*
4020 diesel, 1968 (Good)	4675
4020 diesel, 1968 (Rough)	2650
4010 diesel, 1962 (Fair)	2650
2840 diesel, 1978 (Excellent)	8600
2640 diesel, 1977 (Good)	6500
2510 diesel, 1967 (Excellent)	3700
1520 diesel, 1970 (Good)	2850
1120 diesel, (Fair)	1900
1020 diesel, 1969 (Excellent)	4100
1020, 1968 (Good)	3000
820 diesel, 1970 (Good)	3300
430, 1959 (Good)	1250
60, 1953 (Fair)	550

WHITE TRACTOR

2-62 diesel, 1980 (Good)	5850

OLIVER TRACTOR

1465 diesel, 1974 (Good)	2800*

YODER & FREY, INC.
Archbold, Ohio
July 10, 1984

JOHN DEERE TRACTORS

40, 1955 (Fair)	910
40, 1949 (Fair)	1100*
60, 1955 (Good)	850*
70,	550
70 diesel, 1953 (Fair)	1100*
70, (Good)	650
50, 1952 (Fair)	800*
620, 158 (Fair)	1900
620,	750
MT, 1950 (Fair)	600*
630, 1957 (Fair)	2400*
720, 1957 (Rough)	1300*
730, 1958 (Rough)	1835
2010 diesel, 1963 (Fair)	2000
2010, 1962 (Rough)	2350*
2840 diesel, 1979 (Good)	6800*
3020 diesel, 1971 (Good)	6200*
3020 diesel, 1968 (Good)	4300*
4010 diesel, 1963 (Fair)	3500*
4020 diesel, 1966 (Fair)	3900
4020 diesel, 1967 (Rough)	3700*
4020 diesel, 1965 (Fair)	5450
4020, 1970 (Fair)	6500*
4430, 1976 (Good)	12,250*

FORD TRACTORS

8N, 1952 (Fair)	1500
8N, 1950 (Good)	1350
8N, 1949 (Fair)	1350
8N, 1952 (Good)	1560
8N, 1950 (Good)	1325*
9N, 1944 (Rough)	1050
9N, 1943 (Rough)	950*
800, 1957 (Fair)	1875
800, 1955 (Fair)	2000*
2000, 1970 (Fair)	2400*
4000, 1966 (Fair)	3500*
4000, 1966 (Rough)	1800*
4000, 1963 (Fair)	2600
5000, 1965 (Fair)	6000*
5000 diesel, 1974 (Good)	6100
6000, 1967 (Rough)	1250
8000, 1972 (Fair)	6000*
1500 diesel, (New)	5250*
3000, 1965 (Fair)	3200
3000, 1970 (Fair)	3200*
3000, 1965 (Rough)	2350
Jub., 1953 (Fair)	1710
850, 1957 (Fair)	2175
3910, (New)	9250*
821, 1957 (Rough)	1300*

INTERNATIONAL HARVESTER TRACTORS

B, 1948 (Rough)	260
C, 1948 (Fair)	800*
Cub., 1950 (Fair)	1600*
154 Lo-Boy, 1973 (Fair)	1775
H, 1939 (Fair)	550*
M, 1948 (Fair)	800
M, 1941 (Fair)	830
Sup. M, 1952 (Good)	1075*
W 4, 1949 (Rough)	500*
140, 1961 (Fair)	2350*
300, 1958 (Fair)	975
434 diesel, (Fair)	2100*
400, 1956 (Fair)	875
484, (New)	4500*
Sup. C, 1951 (Fair)	1200
706, 1964 (Good)	4750*
784 diesel, 1976 (Good)	5500*
806, 1964 (Rough)	1500
806 diesel, 1964 (Rough)	2500
856, 1970 (Fair)	6400*
966 hydro, 1973 (Fair)	7500
1066, 1975 (Fair)	7400*
1256, 1970 (Fair)	4750*
1586, 1978 (Good)	13,000*

FERGUSON & MASSEY-FERGUSON

TD-20, 1947 (Fair)	850*
TD-20, 1947 (Rough)	1000
35, 1957 (Fair)	2100
35, 1962 (Fair)	2200*
165 diesel, 1969 (Fair)	2800
165, (Good)	2800*
165, 1974 (Fair)	3900*
165, 1968 (Fair)	3100*
180 diesel, 1972 (Rough)	3300

(More...)

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October 1984
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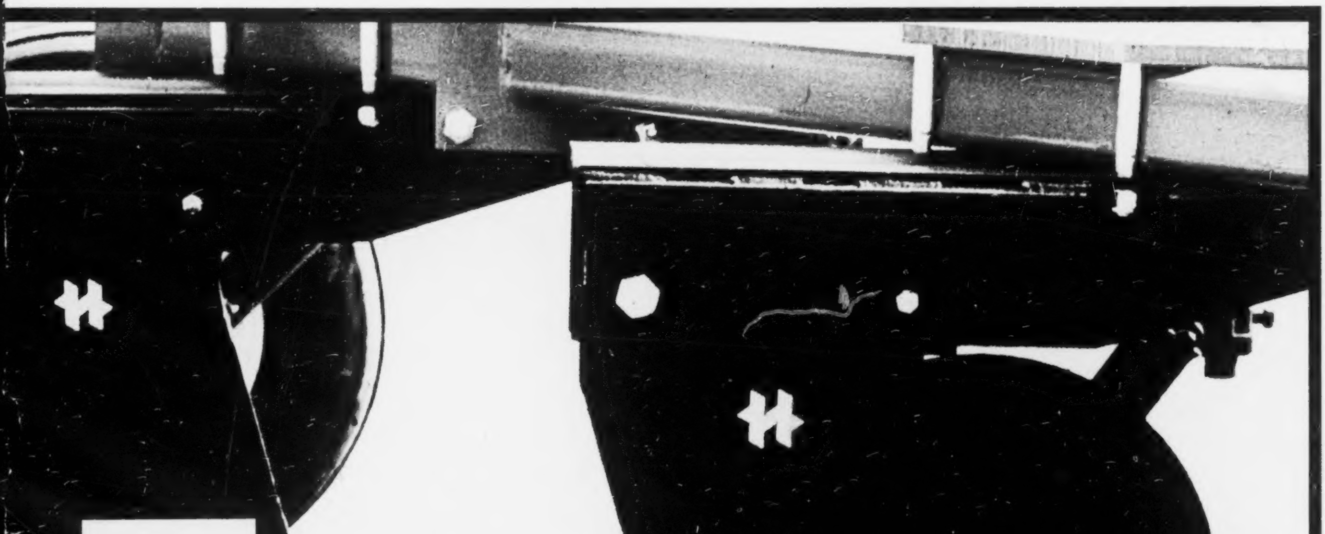
Implement & Tractor



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Editorial, advertising
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Telex: 42-4156; Answerback
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EDITORIAL
Bill Fogarty, Editor
Scott R. Nesbitt, Managing Editor
Irma Allread, Associate Editor
Kevin Callahan, Art Director
Anita Blattner, Graphic Designer
Pat Blanton, Editor, Product File
Jim Baumberger, Editor, Red Book

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Glenn S. Hensley, Dealer Topics
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CIRCULATION
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Implement & Tractor

The business magazine of the farm and industrial equipment industry

October 1984 • Vol. 99 • No. 12

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8: Service Shop Performance Improved in 1983. But the shop is still losing money, according to analysis of the latest annual survey by NFPEDA.

16: I&T's First Design Award Competition for Shortliners. Howard's Paraplow won the competition and four runners-up were named in *Implement & Tractor* magazine's first competition to recognize innovative designs.

34: Staying Alive Means Staying Ahead. Farm equipment distributors stay alive by bringing ideas to the market, says Stuart Lindsay, who's making some changes in his firm, Lindsay Brothers, Inc.

42: New Models from Two Majors. A high-clearance John Deere and two International Harvester tractors.

44: What'll They Be Thinking In Chicago? A preview of the FEMA, FEWA and AIMRA conventions, scheduled for late November in the Second City.

On the cover... The working end of the Howard Paraplow, winner of the first I&T design competition for shortliners.

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I&T Update

August Sales: Tractors Almost Steady

U.S. retail sales of farm tractors in August declined by just under 2 per cent from the same month in 1983. The big declines were in four-wheel-drive tractors and 100-139-hp two-wheel-drive units; tractors under 40 hp gained, as did two-wheel-drive models of 140 hp and over. For the year, tractor volume is up 1.6 per cent on the eight months of 1983.

But all other product types reported in the Farm & Industrial Equipment Institute's flash report were down for August. However, the August declines were not as severe as they were for the full eight months.

Unit Retail Sales	August			January-August		
	1984	**1983**	**Pct. Change**	**1984**	**1983**	**Pct. Change**
Farm Wheel Tractors:						
2-wheel drive						
Under 40 hp	3,561	3,256	+ 9.4	36,678	33,705	+ 8.8
40-99 hp	2,405	2,549	− 5.6	26,975	26,294	+ 2.6
100-139 hp	403	726	− 44.5	6,410	9,818	− 34.7
Over 140 hp	884	731	+ 20.9	8,967	7,864	+ 14.0
Total 2-wheel drive	**7,253**	**7,262**	**− .1**	**79,030**	**77,681**	**+ 1.7**
4-wheel drive						
Under 200 hp	63	120	− 47.5	1,091	1,196	− 8.8
Over 200 hp	88	166	− 47.0	1,750	1,687	+ 3.7
Total 4-wheel drive	**151**	**286**	**− 47.2**	**2,841**	**2,883**	**− 1.5**
Total All Tractors	**7,404**	**7,548**	**− 1.9**	**81,871**	**80,564**	**+ 1.6**
S-P Combines	957	1,107	− 13.6	5,174	6,691	− 22.7
Balers (under 200-lb. bales)	958	980	− 2.2	6,703	7,775	− 13.8
Forage Harvesters (shear-bar type)	331	393	− 15.8	1,807	2,398	− 24.6
Mower-Conditioners	1,143	1,268	− 9.9	10,472	12,240	− 14.4

Canadian Sales: August Was Weak

Farm equipment retail sales in Canada were generally down in August, according to the Canadian Farm & Industrial Equipment Institute. Tractor sales were off 8.4 per cent at 912 units, with the major declines occurring in the larger sizes.

For the first eight months of 1984, however, tractor sales are up 10.3 per cent from the same period in 1983 at 12,080 units. Two-wheel drive tractors under 40 hp: up 25 per cent at 2,490; tractors from 40-99 hp: up 20 per cent at 5,200 units; tractors over 100 hp: down 18 per cent at 2,734 units; four-wheel-drive tractors: up 28 per cent at 1,656 units.

Other eight-month totals: Self-propelled combines: down 3 per cent at 1,263 units; small balers: down 4 per cent at 1,495 units; large balers: down 17 per cent at 1,455 units; mower-conditioners: down 8 per cent at 1,864 units; forage harvesters: down 22 per cent at 348 units; pull-type swathers: up 5 per cent at 1,496; self-propelled swathers: down 14 per cent at 1,221 units.

MF's 1st Half: $9.8 Million Profit

For the first six months of fiscal 1984, ended July 31, Massey-Ferguson Ltd. had net sales of $772.1 million, compared with $804.4 million in the same 1983 period. For the second quarter, sales were $407 million, up from the $401 million reported for 1983's second quarter.

For the six months, MF had a net profit of $9.8 million, $7.4 million of it in the second period. Last year, there was a six-month loss of $29 million and a second quarter loss of $11 million.

Sales volume in North America was up by $20.5 million for the six months to $277.7 million; for the second quarter, sales were up $14.9 million to $155.2 million. Sales in Europe fell from $368 million to $295 million.

Fleischer Mfg. Honored for Its Conservation Work

Fleischer Mfg., Inc., Columbus, Neb., has been given a Distinguished Service citation and a Specialized Machinery Manufacturing citation by the Great Plains Agricultural Council.

The company, its chairman, Leonard Fleischer, and its president, Mathew Fleischer, were honored for the development of the Buffalo line of no-till equipment. The council is an organziation of farm agency and land grant university personnel.

Briefly...

Intertec Publishing Corp., publisher of I&T, has sold *World Farming Agrimanagement* magazine to Sosland Publishing Co., Kansas City, Mo., effective immediately. The publication was founded by Intertec in 1959.

Dr. Brian Long, president of Massey-Ferguson Ltd.'s combines and farm equipment division, has resigned. He is replaced by Ivan Porter, formerly senior vice-president, finance and administration. MF also announced that Darwin G. Kettering, senior vice-president, has retired.

Ford Tractor Factory Unit Sales Up 38 Pct.

Ford Tractor Operations has reported an increase in factory (*i.e.*, wholesale) sales of farm and industrial tractors of 38 per cent – from 10,567 in 1983 to 14,601 – in the first six months of 1984.

Ford also said that its North American retail unit sales volume went up 15 per cent in the first half of 1984. Parts sales in North America for the first half were also reported up 15 per cent over the first half of 1983, "compared with an 8.1 per cent increase for the total industry," said a Ford statement.

Fiat Trattori, China Make Deal

Fiat Trattori, the tractor subsidiary of Fiat, S.p.A., of Italy, has signed a letter of intent with the Chinese government by which Fiat would modernize and equip two Chinese tractor plants.

The plants, Soviet built, would be adapted to produce 14 tractor models in the 45-100 hp range.

China seeks to borrow about $20 million at 2.5 per cent interest and over $10 million in Italian grant aid for the project.

International's Ag Sales Up 11 Pct.

International Harvester Co.'s first nine months (ended July 31) marked an 11 per cent increase in sales of agricultural equipment of $113.4 million from 1983's $1.008 billion to $1.122 billion. For third quarter, agricultural equipment volume was up 17 per cent to $404 million from $346 million in 1983's third period.

Total company sales for the nine months rose from $2.6 billion to $3.5 billion. The first half of 1983 recorded a loss of $401 million; for the first half of 1984, it was cut to $63 million. Net loss in the third period of 1983 was $131 million; the loss was $7 million in 1984's fourth quarter.

AUCTION PRICES OF USED EQUIPMENT

An exclusive I&T monthly report of actual prices paid recently at these leading national wholesale auctions.

Asterisk beside tractor price indicates highest bid offered on tractors which were not sold.

JONES FARM EQUIPMENT CO.
Dothan, Alabama
August 14, 1984

ALLIS-CHALMERS TRACTOR

190 diesel, 1968 (Fair)	2900

CASE TRACTOR

1410 diesel, 1977 (Good)	2450*

DAVID BROWN TRACTOR

990 diesel, 1965 (Good)	1200*

MASSEY-FERGUSON TRACTORS

1135 diesel, 1977 (Good)	5200*
1135 diesel, 1976 (Good)	5300
1135 diesel, 1973 (Rough)	1700
1105 diesel, 1975 (Good)	5100
1085 diesel, 1977 (Good)	3500*
1080 diesel, 1969 (Fair)	2750*
285 diesel, 1977 (Good)	5700*
275 diesel, 1977 (Good)	4700
275 diesel, 1976 (Fair)	4100
255 diesel, 1978 (Fair)	4000
245 diesel, 1977 (Good)	5450*
245 diesel, 1976 (Good)	5550*
175 diesel, (Fair)	2975*
175 diesel, 1972 (Rough)	2200
175 diesel, 1968 (Fair)	2600
175 diesel, 1967 (Fair)	2850
165 diesel, 1972 (Fair)	2850*
165 diesel, 1968 (Rough)	2000
165 diesel, 1968 (Rough)	2100
165 diesel, 1968 (Good)	3350
165 diesel, 1966 (Rough)	1800
135 diesel, 1968 (Fair)	2250
135, 1966 (Good)	2900
65 diesel, 1960 (Good)	1600
65 diesel, 1958 (Good)	1500*
50, 1957 (Fair)	800
50, 1956 (Good)	1650
35 diesel, 1963 (Excellent)	3075
35 diesel, 1959 (Rough)	650
T020, 1948 (Rough)	600
25 diesel, 1964 (Good)	2700*
T030, 1952 (Good)	1100*

FORD-FERGUSON TRACTOR

9N, 1946 (Good)	1000*

FORD TRACTORS

8600 diesel, cab, 1974 (Good)	7000*
7700 diesel, cab, 1976 (Good)	8500*
7600 diesel, 1975 (Good)	4700*
6600 diesel, cab, 1976 (Good)	6500
6600 diesel, 1975 (Fair)	4450
5000 diesel, 1971 (Excellent)	5000*
5000 diesel, 1966 (Rough)	2300*
4000 diesel, 1971 (Excellent)	5000
4000 diesel, 1969 (Good)	3000
4000 diesel, 1966 (Rough)	1750
4000 diesel, 1966 (Fair)	2850
3600 diesel, 1976 (Excellent)	5250
3000 diesel, 1974 (Fair)	3050
3000 diesel, 1966 (Rough)	1750
2600 diesel, 1974 (Excellent)	4400
2000 diesel, 1962 (Fair)	1500
2000 diesel, 1962 (Fair)	1150
851 diesel, 1958 (Fair)	1000
850, 1956 (Excellent)	2200*
841 diesel, 1958 (Good)	1850
641, 1958 (Excellent)	2350
640, 1955 (Excellent)	2550
Sup. Dexta, 1962 (Fair)	800*
Sup. Dexta, 1962 (Good)	1400*
Sup. Dexta, 1962 (Fair)	950*
Jub., 1953 (Fair)	850
Jub., 1953 (Good)	1525
8N, 1952 (Good)	1500
8N, 1952 (Good)	1400*
8N, 1951 (Good)	1500
8N, 1949 (Good)	1250
8N, 1949 (Good)	1275
8N, 1948 (Fair)	950
8N, 1948 (Good)	1225
8N, 1948 (Fair)	1075
8N, 1948 (Good)	1350
8N, 1948 (Good)	1250*
8N, 1948 (Good)	1200
8N, 1948 (Good)	1200

INTERNATIONAL HARVESTER TRACTORS

1086 diesel, 1976 (Excellent)	10,300
684 diesel, 1979 (Excellent)	7500
454 diesel, 1972 (Rough)	1800
434 diesel, 1971 (Rough)	1550
424 diesel, 1965 (Good)	2200
284 diesel, 1976 (Excellent)	4350
H, 1950 (Excellent)	700
Sup. C, 1953 (Fair)	500
140, 1959 (Fair)	1100
140, 1960 (Good)	1425
Sup. A, 1948 (Good)	1250
Sup. A, 1948 (Fair)	1000
154 Cub, Loboy, 1968 (Good)	1000
Cub, 1948 (Good)	900
Cub, mo., 1951 (Excellent)	1725

JOHN DEERE TRACTORS

4630 diesel, 1975 (Good)	11,500*
4620 diesel, 1971 (Fair)	6000*
4030 diesel, 1975 (Good)	7300
3130 diesel, (Fair)	3150
2640 diesel, 1977 (Good)	6700*

(More...)

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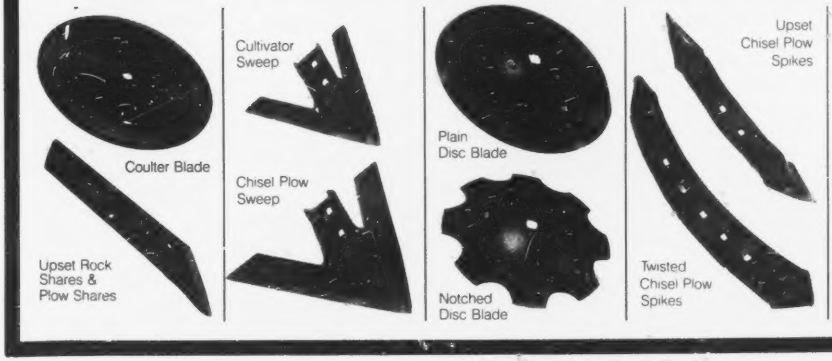

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2640 diesel, 1976 (Good)	6800*
2440 diesel, 1979 (Excellent)	7400
2240 diesel, 1976 (Good)	6500
2130 diesel, (Fair)	2600
2130 diesel, (Rough)	1850
2040 diesel, 1980 (Good)	7150*
2020 diesel, 1969 (Fair)	2500
1120 diesel, (Fair)	1300
435 diesel, 1959 (Fair)	700
40, 1953 (Good)	900*

LEYLAND TRACTORS

384 diesel, 1970 (Rough)	850
344 diesel, 1970 (Good)	1800

LONG TRACTOR

900 diesel, (Good)	2650

WHITE TRACTORS

2-150 diesel, 1975 (Good)	5500*
2-85 diesel, 1976 (Good)	4750

OLIVER TRACTOR

1465 diesel, 1974 (Good)	2700*

YODER & FREY, INC.
Archbold, Ohio
August 14, 1984

INTERNATIONAL HARVESTER TRACTORS

B, 1946 (Fair)	1050*
A, 1945 (Rough)	450
H, 1949 (Fair)	400
H, 1950 (Fair)	425
H, 1947 (Rough)	525
H, 1950 (Rough)	600*
M, 1951 (Fair)	700*
M, 1947 (Rough)	400*
300, 1956 (Fair)	1150*
C, 1951 (Fair)	800*
C, 1950 (Rough)	625*
400, 1956 (Rough)	750*
460, 1959 (Rough)	920
484, 1982 (Excellent)	4600*
656, 1971 (Fair)	4200*
706 diesel, 1965 (Rough)	3600
706 1965 (Fair)	2275
766 diesel, 1974 (Fair)	7000*
806, 1965 (Fair)	3250
806 diesel, 1963 (Fair)	2250*
806, 1964 (Fair)	3000
826 diesel, (Fair)	5800*
856 diesel, 1970 (Fair)	5400*
856, 1970 (Good)	6900*
966 diesel, 1973 (Fair)	7600*
986 diesel, 1979 (Good)	12,000*
1066, 1976 (Fair)	7500
1066, 1974 (Fair)	7750*
1066 diesel, 1975 (Good)	7800*
1066, 1974 (Fair)	6600*
1066, 1974 (Fair)	7500*
1066, 1975 (Good)	7250
1206, 1965 (Fair)	4700*
1256, 1969 (Fair)	4900*
1586, 1978 (Good)	13,500*
3588, 1981 (Good)	17,250*
444, (Fair)	2850*

DEUTZ TRACTOR

D6806, (Good)	8100*

ALLIS-CHALMERS TRACTORS

B, 1950 (Rough)	140
B, 1950 (Fair)	800
WD, 1952 (Fair)	560
WD, 1949 (Fair)	400
WD, 1944 (Rough)	360
WD, 1948 (Fair)	580
WD-45, 1951 (Fair)	700*
190XT, 1965 (Fair)	3600*
190XT, 1966 (Fair)	1800*
5040, 1977 (Good)	3400*
160, 1972 (Rough)	2600*

JOHN DEERE TRACTORS

A, 1951 (Fair)	490*
MT, (Fair)	610
40, 1955 (Fair)	1050*
40, 1957 (Fair)	1700*
630, 1959 (Fair)	1800*
720 diesel, 1957 (Fair)	900*
730 diesel, 1958 (Fair)	2500*
730 diesel, 1958 (Fair)	900
2010 diesel, 1962 (Fair)	1000
2010, 1962 (Rough)	1500*
2030 diesel, 1977 (Fair)	6150
3010 diesel, 1963 (Fair)	3100*
3020 diesel, 1968 (Fair)	4600*
4010 diesel, 1964 (Fair)	4250*
4020 diesel, 1965 (Fair)	4600*
4020, 1971 (Fair)	6100*
4020, 1966 (Fair)	5600*
4020 diesel, 1966 (Fair)	4900*
4020, 1972 (Good)	5300*
4020, 1965 (Fair)	4100*
4020, 1967 (Fair)	7600*
4030, 1973 (Fair)	8100*
4230, 1975 (Fair)	9000
4230, 1975 (Fair)	9500*
4320 diesel, 1975 (Fair)	7000*
4520 diesel, 1973 (Good)	4900
4520, 1971 (Fair)	5600*
5020, 1969 (Rough)	3700*

MASSEY-HARRIS TRACTORS

44, 1950 (Rough)	475*
44, 1945 (Rough)	160

COCKSHUTT TRACTOR

30, 1949 (Fair)	475

FERGUSON & MASSEY-FERGUSON

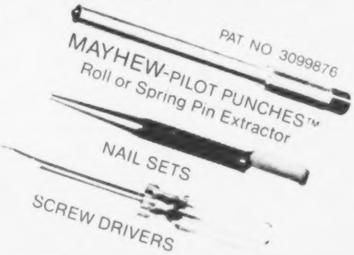
35, 1960 (Fair)	2500
50, 1960 (Fair)	1976*
65, 1963 (Fair)	1400*
65 diesel, 1964 (Fair)	2000*
65, 1959 (Fair)	2100*
85, 1963 (Rough)	1375
150, 1967 (Rough)	2800*
165, 1974 (Rough)	2600*
165, 1974 (Fair)	3700*
180, 1971 (Rough)	2900*
180, 1972 (Fair)	3500*
1085, (Fair)	6500*
1100, 1974 (Fair)	3200*
1135, 1976 (Fair)	9300*
1155, 1975 (Fair)	5900*

FORD TRACTORS

8N, 1949 (Fair)	1050
8N, 1950 (Rough)	1375
8N, 1950 (Fair)	1275
9N, 1941 (Rough)	475
9N, 1943 (Fair)	950*
9N, 1943 (Rough)	925*
9N, 1941 (Rough)	580
9N, 1943 (Rough)	775
4000, 1962 (Rough)	850
4000, 1966 (Fair)	3500
8000, 1972 (Rough)	4750*
8000, 1973 (Fair)	4250*
9000, 1972 (Fair)	4500*
3000, 1965 (Fair)	2500
3000, 1972 (Good)	3100
3000 diesel, 1970 (Rough)	1900*
860, 1956 (Rough)	2300*
860, 1955 (Fair)	2700*
960, 1956 (Rough)	1100*
871, 1957 (Fair)	1450*
Jub., 1953 (Fair)	1750
641, 1955 (Fair)	1700*

CASE TRACTORS

530, 1965 (Fair)	2200*



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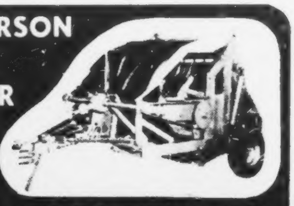

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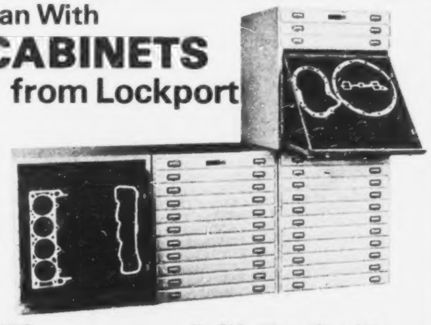

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930, 1966 (Fair)	1600*
930, 1966 (Fair)	1500*
970,	2900
1030, 1967 (Fair)	3500*
1030, 1965 (Fair)	4200*
1070, 1971 (Rough)	4500*
1070, 1971 (Fair)	4700*
1190 diesel, (New)	7250*
1194, (New)	8000*
1370, 1973 (Fair)	6600*
1410,	5200
2670, (Fair)	14,250*
VAC, 1945 (Rough)	160*
VAC, 1947 (Fair)	600*
1410, (Good)	5400*

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770, 1955 (Fair)	1425
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1755 diesel, 1972 (Fair)	4800*
1800 diesel, 1962 (Fair)	2100*
1800 diesel, 1961 (Fair)	2200*
1850, 1967 (Fair)	3500*
1850 diesel, 1966 (Fair)	3200*
1950, 1964 (Fair)	2200*
2150, 1966 (Fair)	4800*
70, 1940 (Rough)	150

MINNEAPOLIS-MOLINE TRACTORS

Jet Star, 1965 (Rough)	1400*
Jet Star, (Fair)	800*
335, 1962 (Fair)	590
M-670, 1967 (Fair)	1600*
UB,	750

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D-15, 1965 (Good)	1575*
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185 diesel, 1972 (Fair)	3800*
5020 diesel, mo. 1983 (Excellent)	5650*

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995 diesel, 1973 (Good)	4000

FERGUSON TRACTORS

20, 1945 (Rough)	600
20, 1946 (Good)	1250

FORD TRACTORS

9N, 1943 (Fair)	825
9N, 1945 (Fair)	825
9N, 1945 (Good)	975
9N, 1946 (Fair)	825
8N, 1948 (Good)	1350
8N, 1949 (Fair)	975*
8N, 1949 (Good)	1350
8N, 1949 (Rough)	800
8N, 1951 (Good)	1725
8N, 1951 (Good)	1525
8N, 1952 (Good)	1500*
8N, 1952 (Good)	1675
NAA, 1953 (Good)	2200
NAA, 1953 (Fair)	1650*
NAA, 1953 (Good)	1900
601, 1958 (Rough)	1575
800, ldr., 1955 (Good)	2950
800, 1956 (Fair)	1850
850, backhoe, 1957 (Fair)	2900*
850, 1957 (Good)	2100*
801, 1960 (Good)	2250*
950, 1957 (Fair)	900
3000 diesel, 1965 (Fair)	2450*
3000, 1967 (Good)	3050
3000 diesel, 1970 (Good)	3650
3000 diesel, 1970 (Good)	3550
4000 diesel, 1966 (Good)	3100
4000 diesel, 1969 (Good)	3600
4000 diesel, 1970 (Fair)	3150*
4000 diesel, 1970 (Good)	3600
2600 diesel,	5100

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Cub, mo., 1964 (Fair)	1425
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300, 1955 (Fair)	1250
300, ldr., 1956 (Fair)	1450
130, 1958 (Good)	1150*
460 diesel, 1960 (Good)	1750*
706 LP, 1965 (Good)	2200
706, 1968 (Good)	3850*
2400, backhoe, 1969 (Good)	5650
2424, 1962 (Fair)	1900
2444, 1961 (Fair)	2500
2444, 1963 (Fair)	2700
2444, 1968 (Good)	3525
2544 diesel, 1966 (Fair)	2600
3000 diesel, ldr., 1971 (Good)	4400
384 diesel, 1969 (Good)	3350*
450, 1958 (Good)	3050
674, 1975 (Good)	4500*

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720 diesel, 1957 (Good)	1750
1020 diesel, 1969 (Good)	3300
1020 diesel, 1970 (Good)	3550
1120 diesel, 1970 (Good)	3450
4010 diesel, 1962 (Good)	3500
4020 diesel, 1965 (Good)	4650
4020 cab, diesel, 1967 (Good)	5100
830 diesel, ldr., 1975 (Excellent)	5200*
2130 diesel, 1968 (Fair)	3500*

MASSEY-FERGUSON TRACTORS

35, 1961 (Good)	2650
35, 1962 (Fair)	1900*
50, 1959 (Fair)	1700*
50, 1960 (Good)	2500*
50, ldr., 1964 (Excellent)	4400*
65, 1958 (Fair)	1750
65 diesel, 1961 (Good)	2450*
65 diesel, 1964 (Good)	2700*
S-90, 1963 (Good)	2150
135, 1969 (Good)	3300
135, 1969 (Good)	3300
135 diesel, 1970 (Fair)	3150*
2135, ldr., 1968 (Good)	4150
150 diesel, 1966 (Good)	3275*
150 diesel, 1974 (Good)	4250
165, ldr., 1967 (Fair)	2900*
165 diesel, 1968 (Fair)	2850
165 diesel, 1968 (Good)	3350
175 diesel, 1965 (Fair)	3150
180 diesel, 1966 (Good)	3300
180 diesel, 1970 (Good)	3900*
1080 diesel, 1971 (Good)	5200
1085 diesel, 1974 (Fair)	5100*
1085 diesel cab, 1978 (Good)	7500
40-B, backhoe, 1968 (Good)	6750
235 diesel, 1975 (Fair)	3600*
235 diesel, 1976 (Good)	4000
240, 1984 (New)	8050*
245 diesel, 1979 (Good)	4750
245, 1980 (Good)	5800*
245 diesel, 1980 (Good)	6100*
255, ldr., 1978 (Good)	7150*
275, 1977 (Good)	6200

MINNEAPOLIS-MOLINE TRACTOR

670, 1960 (Good)	2450*

OLIVER TRACTORS

S-88 diesel, 1955 (Fair)	1100*
550, 1963 (Fair)	1525

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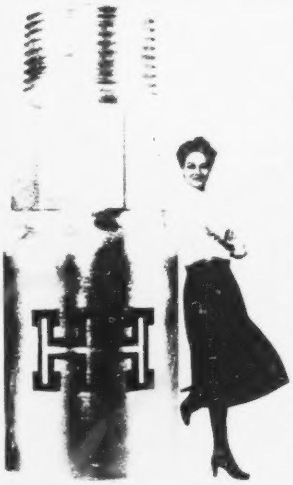

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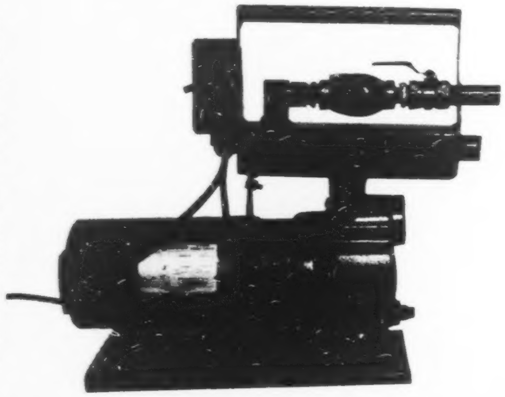

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